Vol. 1113 No. 1

# OFFICIAL GAZETTE

of the

## UNITED STATES PATENT AND TRADEMARK OFFICE

Route to:

1790 ***Celebrating 200 Years of Creativity*** 1990

U.S. DEPARTMENT OF COMMERCE

Patent and Trademark Office

# OFFICIAL GAZETTE of the UNITED STATES PATENT AND TRADEMARK OFFICE

July 17, 1990 Volume 1116 Number 3


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# PATENT AND TRADEMARK OFFICE NOTICES

## Patent Cooperation Treaty (PCT) Information

For information concerning the PCT member countries see the notice appearing in the *Official Gazette* at 1109 O.G. 3 on Dec. 5, 1989.

For use of the European Patent Office as an International Searching Authority for international applications filed in the United States Receiving Office, see the notice appearing in the *Official Gazette* at 1022 O.G. 5 on Sept. 28, 1982.

For use of the European Patent Office as an International Preliminary Examining Authority for international applications filed in the United States Receiving Office, see the notices appearing in the *Official Gazette* at 1080 O.G. 2 on July 7, 1987 and at 1091 O.G. 2 on June 7, 1988.

The search fee of the European Patent Office was changed due to a difference in the exchange rate of the U.S. dollar in relation to the German Mark as of March 1, 1990, and was announced in the *Official Gazette* at 1111 O.G. 24 on Feb. 20, 1990.

International PCT fees were changed on June 1, 1989 due to a difference in the exchange rate of the U.S. dollar in relaton to the Swiss Franc and were announced in the *Official Gazette* at 1102 O.G. 90 on May 30, 1989.

Certain domestic PCT fees and charges for International Search and Preliminary Examination have been changed effective Apr. 17, 1989 and were announced in the *Official Gazette* at 1100 O.G. 24 on Mar. 7, 1989.

The current schedule of PCT fees ( in U.S. dollars) is as follows:

| | |
|---|---|
| Transmittal fee: | 170.00 |
| Search Fee | |
| U.S. Patent and Trademark Office (USPTO) as International Searching Authority (ISA) | |
| —No corresponding prior U.S. national application filed | 550.00 |
| —Corresponding prior U.S. national application filed | 380.00 |
| —Supplemental search fee, per additional invention | 150.00 |
| European Patent Office as ISA | 1242.00 |
| Preliminary examination fee | |
| USPTO as International Preliminary Examining Authority (IPEA) | |
| —Search fee paid to USPTO as ISA. | 400.00 |
| —Additional examination fee, per additional invention | 130.00 |
| —ISA not the USPTO | 600.00 |
| —Additional examination fee, per additional invention | 200.00 |
| International fees | |
| Basic fee | 436.00 |
| Basic Supplemental fee (for each page over 30) | 9.00 |
| Designation fee per country or region for the first 10 national or regional offices | 106.00 |
| Designation fee for 11th and subsequent designations | No Charge |
| Handling fee | 134.00 |

U.S. National Stage fees

| | Small Entity | Regular |
|---|---|---|
| USPTO was IPEA | 165.00 | 330.00 |
| USPTO was ISA but not IPEA | 185.00 | 370.00 |
| USPTO was neither ISA nor IPEA | 250.00 | 500.00 |
| USPTO was IPEA and all claims presented satisfied provisions of PCT Article 33(2) to (4) | 25.00 | 50.00 |
| —For each independent claim in excess of 3 | 18.00 | 36.00 |
| —For each claim in excess of 20 | 6.00 | 12.00 |
| —For each application containing a multiple dependent claim | 60.00 | 120.00 |
| —Surcharge for filing national fee or oath or declaration after the time limit applicable under PCT 1112 OG 2 Article 22 or 39(1) | 60.00 | 120.00 |
| —Processing fee for filing English translation after the time limit applicable under PCT Article 22 or 39(1) | 30.00 | 30.00 |

Apr. 30, 1990

HARRY F. MANBECK, Jr.
*Assistant Secretary and Commissioner of Patents and Trademarks.*

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## Patent Cooperation Treaty Update

The International Bureau of the World Intellectual Property Organization has informed the U. S. Patent and Trademark Office that, due to changes in the exchange rate of the U. S. dollar with regard to the Swiss Franc, the dollar amount of the international fees for international applications filed in the United States Receiving Office will increase, effective September 1, 1990.

Effective September 1, 1990 the amount of the international fees for internationl applications filed in the United States Receiving Office will be:

| | |
|---|---|
| Basic fee (first 30 pages) | $502.00 |
| Basic Supplemental fee (for each page over 30) | $ 10.00 |
| Designation fee (per country or region up to 10) | $122.00 |
| Handling fee | $154.00 |

June 20, 1990

HARRY F. MANBECK, Jr.
*Assistant Secretary and Commissioner of Patents and Trademarks*

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## Patent Cooperation Treaty Information

### The European Patent Office as an International Preliminary Examining Authority for International Applications filed with the United States Patent and Trademark Office as a Receiving Office

Pursuant to a recent communication from the President of the European Patent Office (EPO) to the Commissioner of Patents and Trademarks, the EPO has confirmed that beginning July 1, 1990, it will continue to act as an International Preliminary Examining Authority (IPEA) for international applications filed with the United States Patent and Trademark Office as the Receiving Office. Furthermore, effective July 1, 1990, there will be no limit on the number of international applications originating in the United States which will be examined by the EPO as the

IPEA, provided that the EPO acted as the International Searching Authority for these applications.

June 18, 1990 HARRY F. MANBECK, Jr.
*Assistant Secretary and Commissioner of Patents and Trademarks*

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**Notice of Maintenance Fees Payable**

Title 37, Code of Federal Regulations, Section 1.362(d), effective Nov. 1, 1984, provides that maintenance fees may be paid without surcharge for a six-month period beginning 3, 7, and 11 years after the date of issue of patents based on application filed on or after Dec. 12, 1980. An additional six-month grace period is provided by 35 U.S.C. 41(b) and 37 CFR 1.362(e) for payment of the maintenance fee with the surcharge set forth in 37 CFR 1.20(k) or (l), as amended effective Apr. 17, 1989. If the maintenance fee is not paid in a patent requiring such payment the patent will expire on the 4th, 8th or 12th anniversary of the patent.

Attention is drawn to the patents which were issued on July 14, 1987 for which maintenance fees due at 3 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,679,253 through 4,680,811
Reissue Patents based on the above identified patents.

Attention is drawn to the patents which were issued on July 12, 1983 for which maintenance fees due at 7 years and six months may now be paid. The patents have patent numbers within the following ranges:

Utility Patents 4,392,257 through 4,393,518
Reissue Patents based on the above identified patents.

No maintenance fees are required for design or plant patents.

Payments of maintenance fees in patents should be directed to "Commissioner of Patents and Trademarks, Box M. Fee, Washington, D.C. 20231."

The current amounts of the maintenance fees due at 3 years and six months and seven years and six months are set forth in 37 CFR 1.20(e), (f), (h) and (i), as amended effective Apr. 17, 1989, which are reproduced below:

37 CFR § 1.20 Post-issuance fees

"(e) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 4 years; the fee is due by three years and six months after the original grant.....$245.00

"(f) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Dec. 12, 1980 and before Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant.....$495.00"

"(h) For maintaining an original or reissue patent except a design or plant patent, based on an application filed on or after Aug. 27,1982, in force beyond 4 years; the fee is due by three years and six months after the original grant:

By a small entity (§1.9(f)).....$245.00
By other than a small entity.....$490.00"

"(i) For maintaining an original or reissue patent, except a design or plant patent, based on an application filed on or after Aug. 27, 1982, in force beyond 8 years; the fee is due by seven years and six months after the original grant:

By a small entity (§1.9(f)).....$495.00
By other than a small enttity.....$990.00"

The amounts of the surcharges as amended effective Apr. 17, 1989, are set forth in 37 CFR 1.20 (k), (l) and (m) which are reproduced below:

"(k) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months , seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Dec. 12, 1980 and before Aug. 27,1982.....$120.00"

"(l) Surcharge for paying a maintenance fee during the 6-month grace period following the expiration of three years and six months, seven years and six months, and eleven years and six months after the date of the original grant of a patent based on an application filed on or after Aug. 27, 1982:

By a small entity(§1.9(f)).....$60.00
By other than a small entity.....$120.00"

"(m) Surcharge for accepting a maintenance fee after expiration of a patent for non-timely payment of a maintenance fee where the delay is shown to the satisfaction of the Commissioner to have been unavoidable.....$550.00"

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**Notice of Expiration of Patents Due to Failure to Pay Maintenance Fees**

35 U.S.C. 41 and 37 CFR 1.362(g) provide that if the required maintenance fee and any applicable surcharge are not paid in a patent requiring such payment, the patent will expire at the end of the 4th, 8th, or 12th anniversary of the grant of the patent depending on the first maintenance fee which was not paid.

According to the records of the Office, the patents listed below have expired due to failure to pay the required maintenance fee and any applicable surcharge.

*PATENTS WHICH EXPIRED MAY 6, 1990*
*DUE TO FAILURE TO PAY MAINTENANCE FEES*

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,327,517 | 06/216,596 | 5/04/82 |
| 4,327,614 | 06/226,475 | 5/04/82 |
| 4,327,673 | 06/253,791 | 5/04/82 |
| 4,327,750 | 06/271,115 | 5/04/82 |
| 4,327,795 | 06/224,143 | 5/04/82 |
| 4,327,880 | 06/247,666 | 5/04/82 |
| 4,327,977 | 06/226,275 | 5/04/82 |
| 4,327,983 | 06/266,349 | 5/04/82 |
| 4,328,002 | 06/273,912 | 5/04/82 |
| 4,328,073 | 06/221,122 | 5/04/82 |
| 4,328,084 | 06/223,357 | 5/04/82 |
| 4,328,188 | 06/240,585 | 5/04/82 |
| 4,328,191 | 06/233,401 | 5/04/82 |
| 4,328,206 | 06/238,750 | 5/04/82 |
| 4,328,208 | 06/265,559 | 5/04/82 |
| 4,328,242 | 06/222,748 | 5/04/82 |
| 4,328,273 | 06/238,653 | 5/04/82 |
| 4,328,354 | 06/248,982 | 5/04/82 |
| 4,328,369 | 06/224,998 | 5/04/82 |
| 4,328,391 | 06/226,334 | 5/04/82 |

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,328,476 | 06/217,184 | 5/04/82 |
| 4,328,537 | 06/242,978 | 5/04/82 |
| 4,586,200 | 06/593,550 | 5/06/86 |
| 4,586,201 | 06/609,770 | 5/06/86 |
| 4,586,209 | 06/405,443 | 5/06/86 |
| 4,586,210 | 06/710,124 | 5/06/86 |
| 4,586,213 | 06/688,578 | 5/06/86 |
| 4,586,217 | 06/694,252 | 5/06/86 |
| 4,586,221 | 06/675,749 | 5/06/86 |
| 4,586,227 | 06/607,974 | 5/06/86 |
| 4,586,230 | 06/630,826 | 5/06/86 |
| 4,586,235 | 06/711,986 | 5/06/86 |
| 4,586,236 | 06/571,564 | 5/06/86 |
| 4,586,243 | 06/672,994 | 5/06/86 |
| 4,586,248 | 06/652,514 | 5/06/86 |
| 4,586,252 | 06/702,222 | 5/06/86 |
| 4,586,261 | 06/565,694 | 5/06/86 |
| 4,586,262 | 06/644,791 | 5/06/86 |
| 4,586,263 | 06/712,381 | 5/06/86 |
| 4,586,267 | 06/638,490 | 5/06/86 |
| 4,586,275 | 06/732,943 | 5/06/86 |
| 4,586,278 | 06/698,806 | 5/06/86 |
| 4,586,279 | 06/666,103 | 5/06/86 |
| 4,586,285 | 06/679,749 | 5/06/86 |
| 4,586,296 | 06/627,437 | 5/06/86 |
| 4,586,297 | 06/604,013 | 5/06/86 |
| 4,586,302 | 06/539,836 | 5/06/86 |
| 4,586,305 | 06/596,029 | 5/06/86 |
| 4,586,310 | 06/638,477 | 5/06/86 |
| 4,586,311 | 06/498,132 | 5/06/86 |
| 4,586,318 | 06/564,253 | 5/06/86 |
| 4,586,319 | 06/620,836 | 5/06/86 |
| 4,586,323 | 06/679,284 | 5/06/86 |
| 4,586,328 | 06/377,128 | 5/06/86 |
| 4,586,332 | 06/672,723 | 5/06/86 |
| 4,586,333 | 06/663,877 | 5/06/86 |
| 4,586,345 | 06/695,369 | 5/06/86 |
| 4,586,354 | 06/574,409 | 5/06/86 |
| 4,586,358 | 06/578,968 | 5/06/86 |
| 4,586,365 | 06/669,047 | 5/06/86 |
| 4,586,386 | 06/665,934 | 5/06/86 |
| 4,586,393 | 06/690,397 | 5/06/86 |
| 4,586,394 | 06/403,849 | 5/06/86 |
| 4,586,396 | 06/627,629 | 5/06/86 |
| 4,586,400 | 06/502,709 | 5/06/86 |
| 4,586,404 | 06/642,172 | 5/06/86 |
| 4,586,408 | 06/701,342 | 5/06/86 |
| 4,586,409 | 06/595,949 | 5/06/86 |
| 4,586,411 | 06/636,262 | 5/06/86 |
| 4,586,412 | 06/639,025 | 5/06/86 |
| 4,586,413 | 06/698,605 | 5/06/86 |
| 4,586,414 | 06/651,607 | 5/06/86 |
| 4,586,420 | 06/541,072 | 5/05/86 |
| 4,586,427 | 06/601,125 | 5/06/86 |
| 4,586,431 | 06/621,096 | 5/06/86 |
| 4,586,436 | 06/650,032 | 5/06/86 |
| 4,586,438 | 06/652,268 | 5/06/86 |
| 4,586,447 | 06/582,313 | 5/06/86 |
| 4,586,451 | 06/629,501 | 5/06/86 |
| 4,586,452 | 06/614,113 | 5/06/86 |
| 4,586,454 | 06/634,815 | 5/06/86 |
| 4,586,456 | 06/616,179 | 5/06/86 |
| 4,586,465 | 06/689,983 | 5/06/86 |
| 4,586,466 | 06/472,500 | 5/06/86 |
| 4,586,467 | 06/545,893 | 5/06/86 |
| 4,586,482 | 06/648,083 | 5/06/86 |
| 4,586,492 | 06/521,440 | 5/06/86 |
| 4,586,494 | 06/552,370 | 5/06/86 |
| 4,586,497 | 06/546,968 | 5/06/86 |
| 4,586,500 | 06/504,160 | 5/06/86 |
| 4,586,501 | 06/543,272 | 5/06/86 |
| 4,586,505 | 06/606,762 | 5/06/86 |
| 4,586,506 | 06/656,185 | 5/06/86 |
| 4,586,514 | 06/521,957 | 5/06/86 |
| 4,586,516 | 06/659,663 | 5/06/86 |
| 4,586,526 | 06/778,280 | 5/06/86 |
| 4,586,527 | 06/605,132 | 5/06/86 |
| 4,586,529 | 06/630,248 | 5/06/86 |
| 4,586,531 | 06/653,060 | 5/06/86 |
| 4,586,532 | 06/760,966 | 5/06/86 |
| 4,586,538 | 06/608,571 | 5/06/86 |
| 4,586,549 | 06/618,404 | 5/06/86 |
| 4,586,552 | 06/573,672 | 5/06/86 |
| 4,586,556 | 06/629,816 | 5/06/86 |
| 4,586,564 | 06/677,190 | 5/06/86 |
| 4,586,570 | 06/426,291 | 5/06/86 |
| 4,586,572 | 06/608,962 | 5/06/86 |
| 4,586,580 | 06/462,775 | 5/06/86 |
| 4,586,584 | 06/720,873 | 5/06/86 |
| 4,586,590 | 06/697,770 | 5/06/86 |
| 4,586,593 | 06/386,014 | 5/06/86 |
| 4,586,597 | 06/692,526 | 5/06/86 |
| 4,586,599 | 06/543,774 | 5/06/86 |
| 4,586,603 | 06/605,280 | 5/06/86 |
| 4,586,618 | 06/594,228 | 5/06/86 |
| 4,586,628 | 06/548,007 | 5/06/86 |
| 4,586,637 | 06/623,316 | 5/06/86 |
| 4,586,645 | 06/574,292 | 5/06/86 |
| 4,586,659 | 06/678,099 | 5/06/86 |
| 4,586,665 | 06/675,211 | 5/06/86 |
| 4,586,666 | 06/585,991 | 5/06/86 |
| 4,586,677 | 06/539,555 | 5/06/86 |
| 4,586,678 | 06/715,181 | 5/06/86 |
| 4,586,686 | 06/670,989 | 5/06/86 |
| 4,586,691 | 06/733,667 | 5/06/86 |
| 4,586,697 | 06/671,818 | 5/06/86 |
| 4,586,706 | 06/711,142 | 5/06/86 |
| 4,586,713 | 06/687,167 | 5/06/86 |
| 4,586,723 | 06/353,611 | 5/06/86 |
| 4,586,724 | 06/597,998 | 5/06/86 |
| 4,586,725 | 06/701,625 | 5/06/86 |
| 4,586,729 | 06/604,724 | 5/06/86 |
| 4,586,730 | 06/615,316 | 5/06/86 |
| 4,586,737 | 06/643,170 | 5/06/86 |
| 4,586,740 | 06/641,547 | 5/06/86 |
| 4,586,741 | 06/632,643 | 5/06/86 |
| 4,586,745 | 06/254,886 | 5/06/86 |
| 4,586,761 | 06/543,553 | 5/06/86 |
| 4,586,768 | 06/609,904 | 5/06/86 |
| 4,586,798 | 06/661,114 | 5/06/86 |
| 4,586,804 | 06/661,964 | 5/06/86 |
| 4,586,816 | 06/564,826 | 5/06/86 |
| 4,586,817 | 06/583,973 | 5/06/86 |
| 4,586,818 | 06/545,501 | 5/06/86 |
| 4,586,819 | 06/510,912 | 5/06/86 |
| 4,586,824 | 06/653,476 | 5/06/86 |
| 4,586,826 | 06/686,897 | 5/06/86 |
| 4,586,836 | 06/577,846 | 5/06/86 |
| 4,586,854 | 06/744,115 | 5/06/86 |
| 4,586,865 | 06/710,933 | 5/06/86 |
| 4,586,866 | 06/624,840 | 5/06/86 |
| 4,586,869 | 06/491,199 | 5/06/86 |
| 4,586,872 | 06/558,838 | 5/06/86 |
| 4,586,884 | 06/718,197 | 5/06/86 |
| 4,586,889 | 06/528,418 | 5/06/86 |
| 4,586,890 | 06/726,840 | 5/06/86 |
| 4,586,896 | 06/692,771 | 5/06/86 |
| 4,586,897 | 06/743,641 | 5/06/86 |

| Patent Number | Serial Number | Issue Date |
|---|---|---|
| 4,586,900 | 06/710,848 | 5/06/86 |
| 4,586,901 | 06/659,243 | 5/06/86 |
| 4,586,904 | 06/717,727 | 5/06/86 |
| 4,586,905 | 06/712,399 | 5/06/86 |
| 4,586,909 | 06/612,624 | 5/06/86 |
| 4,586,912 | 06/734,035 | 5/06/86 |
| 4,586,914 | 06/710,684 | 5/06/86 |
| 4,586,919 | 06/597,706 | 5/06/86 |
| 4,586,921 | 06/523,929 | 5/06/86 |
| 4,586,933 | 06/644,674 | 5/06/86 |
| 4,586,952 | 06/669,024 | 5/06/86 |
| 4,586,975 | 06/655,982 | 5/06/86 |
| 4,586,977 | 06/596,359 | 5/06/86 |
| 4,586,985 | 06/583,583 | 5/06/86 |
| 4,586,990 | 06/579,481 | 5/06/86 |
| 4,586,991 | 06/653,888 | 5/06/86 |
| 4,586,994 | 06/558,661 | 5/06/86 |
| 4,587,002 | 06/736,587 | 5/06/86 |
| 4,587,006 | 06/754,937 | 5/06/86 |
| 4,587,009 | 06/751,026 | 5/06/86 |
| 4,587,019 | 06/690,538 | 5/06/86 |
| 4,587,027 | 06/648,009 | 5/06/86 |
| 4,587,032 | 06/668,917 | 5/06/86 |
| 4,587,036 | 06/673,736 | 5/06/86 |
| 4,587,042 | 06/583,676 | 5/06/86 |
| 4,587,048 | 06/601,747 | 5/06/86 |
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| 4,587,081 | 06/605,090 | 5/06/86 |
| 4,587,083 | 06/521,815 | 5/06/86 |
| 4,587,092 | 06/735,720 | 5/06/86 |
| 4,587,106 | 06/452,708 | 5/06/86 |
| 4,587,108 | 06/538,703 | 5/06/86 |
| 4,587,112 | 06/746,810 | 5/06/86 |
| 4,586,128 | 06/645,701 | 5/06/86 |
| 4,587,135 | 06/669,310 | 5/06/86 |
| 4,587,141 | 06/561,904 | 5/06/86 |
| 4,587,158 | 06/769,371 | 5/06/86 |
| 4,586,191 | 06/568,498 | 5/06/86 |
| 4,587,207 | 06/654,446 | 5/06/86 |
| 4,587,210 | 06/595,195 | 5/06/86 |
| 4,587,212 | 06/495,601 | 5/06/86 |
| 4,587,213 | 06/214,637 | 5/06/86 |
| 4,587,233 | 06/549,961 | 5/06/86 |
| 4,587,250 | 06/465,025 | 5/06/86 |
| 4,587,251 | 06/625,071 | 5/06/86 |
| 4,587,259 | 06/626,556 | 5/06/86 |
| 4,587,265 | 06/464,702 | 5/06/86 |
| 4,587,303 | 06/487,286 | 5/06/86 |
| 4,587,312 | 06/613,139 | 5/06/86 |
| 4,587,328 | 06/714,610 | 5/06/86 |
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| 4,587,338 | 06/650,357 | 5/06/86 |
| 4,587,347 | 06/628,175 | 5/06/86 |
| 4,587,357 | 06/656,577 | 5/06/86 |
| 4,587,359 | 06/611,247 | 5/06/86 |
| 4,587,367 | 06/727,177 | 5/06/86 |
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| 4,587,617 | 06/543,038 | 5/06/86 |
| 4,587,619 | 06/330,384 | 5/06/86 |
| 4,587,662 | 06/573,785 | 5/06/86 |

## REISSUE APPLICATIONS FILED

Notice under 37 CFR 1.11(b). The reissue applications listed below are open to inspection by the general public in the indicated Examining Groups and copies may be obtained by paying the fee therefor (37 CFR 1.21(b)).

**4,659,884**, Re. S. N. 07/531,916, Filed May 29, 1990, Cl. 200/50R, SAFETY INTERLOCK SWITCHING DEVICE FOR PROTECTING EQUIPMENT, Jacob Wollenhaupt, Owner of Record: *Helmut Letzel, Cologne, West Germany*, Attorney or Agent: Karl Horman, Ex. Gp.: 214

**4,674,647**, Re. S. N. 07/370,506, Filed June 22, 1990, Cl. 220/006, COLLAPSIBLE STORAGE BIN, Andrew A. Hoopes, et al., Owner of Record: *Xytec Plastics, Inc., Seattle, Wash.*, Attorney or Agent: Sheri M. Novack, Ex. Gp.: 241

**4,696,489**, Re. S. N. 07/487,024, Filed Feb. 28, 1990, Cl. 280/707, AUTOMATIC SUSPENSION SYSTEM WITH VARIABLE DAMPING CHARACTERISTICS, Takeshi Fujishiro, et al., Owner of Record: *Nissan Motor Co., Ltd., Ohama-Shi, Japan*, Attorney or Agent: John J. Feldhaus, Ex. Gp.: 316

**4,733,375**, Re. S. N. 07/500,613, Filed Mar. 22, 1990, Cl. 365/206, NON-VOLATILE MEMORY CIRCUIT, Yoshiyuki Terashima, Owner of Record: *Seiko Epson Kabushiki Keisha, Tokyo, Japan*, Attorney or Agent: Harold I. Kaplan, Ex. Gp.: 233

**4,741,670**, Re. S. N. 07/517,615, Filed May 2, 1990, Cl. 416/129, PROPELLER COMBINATION FOR A BOAT PROPELLER UNIT, Lennart H. Brandt, Owner of Record: *AB Volvo Penta, Goteborg, Sweden*, Attorney or Agent: John C. Altmiller, Ex. Gp.: 341

**4,748,521**, Re. S. N. 07/531,084, Filed May 31, 1990, Cl. 360/85, MAGNETIC RECORDING/REPRODUCING APPARATUS FOR RECORDING ONTO OR REPRODUCING FROM A MAGNETIC TAPE, Atsuo Osawa, et al., Owner of Record: *Hitachi, Ltd., Tokyo, Japan*, Attorney or Agent: Stanley A. Wal, Ex. Gp.: 233

**4,796,944**, Re. S. N. 07/458,190, Filed Dec. 28, 1989, Cl. 296/97, SPRING-LOADED HINGE ASSEMBLY FOR VEHICLE ACCESSORIES, Mark Lobanoff, et al., Owner of Record: *Irvin Industries, Inc., Rochester Hills, Mich.*, Attorney or Agent: Ronald W. Wangerow, Ex. Gp.: 312

**4,829,936**, Re. S. N. 07/520,674, Filed May 7, 1990, Cl. 119/82, LIVESTOCK WORKING SYSTEM, Jon D. Mollhagen,

Owner of Record: *Inventor*, Attorney or Agent: Mark Brown, Ex. Gp.: 333

**4,857,814**, Re. S. N. 07/526,711, Filed May 17, 1990, Cl. 318/281, ELECTRONIC MOTOR CONTROLS, LAUNDRY MACHINES INCLUDING SUCH CONTROLS AND/OR METHODS OF OPERATING SUCH CONTROLS, Gerald D. Duncan, Owner of Record: *Fisher & Paykel Ltd., Aukland, New Zealand*, Attorney or Agent: D. Bruce Prout, Ex. Gp.: 217

## REQUESTS FOR REEXAMINATION FILED

Notice under 37 CFR 1.11(c). The requests for reexamination listed below are open to inspection by the general public in the indicated Examining Groups. Copies of the requests and related papers may be obtained by paying the fee therefor established in the Rules (37 CFR 1.19(a)).

In the event correspondence to the patent owner is not received, this notice will be considered to be constructive notice to the patent owner and reexamination will proceed (37 CFR 1.248(a)(5) and 1.525(b).

**4,002,746**, Reexam. No. 90/002,043, Requested June 4, 1990, Cl. 514/178, SYNTHESIS OF GON-4-ENES, Gordon A. Hughes, et al., Owner of Record: *Herchel Smith, West Chester, Pa.*, Attorney or Agent: Kenyon & Kenyon, Ex. Gp.: 120, Requester: American Home Products, Inc., New York, N. Y.

**4,076,645**, Reexam. No. 90/002,047, Requested May 29, 1990, Cl. 252/700, CHEMICAL LIGHTING PROCESS AND COMPOSITION, Mary-Louise Vega, Owner of Record: *American Cyanmid Co., Wayne, N. J.*, Attorney or Agent: Pennie & Edmonds, Ex. Gp.: 220, Requester: Owner

**4,193,889**, Reexam. No. 90/002,044, Requested June 6, 1990, Cl. 252/316, MICROENCAPSULATION WITH MODIFIED ALIPHATIC POLYSOCYANATES, Gunther Baatz, et al., Owner of Record: *Bayer Aktiengesellschaft, Leverkusen, Germany*, Attorney or Agent: Sprung, Horn, Kramer & Woods, Ex. Gp.: 220, Requester: Owner

**4,361,137**, Reexam. No. 90/002,045, Requested June 11, 1990, Cl. 128/1, INCUBATOR HAVING WARM AIR CURTAIN ACROSS ACCESS OPENING, James R. Grosholz, Owner of Record: *Air-Shields, Inc., Hatboro, Pa.*, Attorney or Agent: Unknown, Ex. Gp.: 330, Requester: Owner

**4,715,541**, Reexam. No. 90/002,042, Requested June 4, 1990, Cl. 239/533, FUEL INJECTION NOZZLE FOR COMBUSTION ENGINES, Otto Freudenschuss, et al., Owner of Record: *Steyer-Daimler Puch, Vienna, Austria*, Attorney or Agent: Marorek, Guttman & Rubenstein, Ex. Gp.: 310, Requester: Owner

**4,835,182**, Reexam. No. 90/002,048, Requested June 8, 1990, Cl. 514/538, ENHANCING DRUG DELIVERY TO THE BRAIN, Nigel H. Grieg, et al., Owner of Record: *The Government of the USA, The Dept. of Health, Bethesda, Md.*, Attorney or Agent: Birch, Stewart, Kolasch & Birch, Ex. Gp.: 120, Requester: Owner

**4,858,001**, Reexam. No. 90/002,046, Requested June 8, 1990, Cl. 358/98, MODULAR ENDOSCOPIC APPARATUS WITH IMAGE ROTATION, Miles C. Milbank, et al., Owner of Record: *High-Tech Medical Instrumentation, Inc., Dublin, Calif.*, Attorney or Agent: Unknown, Ex. Gp.: 260, Requester: Welch Allyn, Inc., Skaneateles Falls, N. Y.

## Errata

"All reference to Patent No. 4,897,271 to Petros S. Taoukis et al of Minneapolis, Minn. for `INHIBITION OF ENZYMATIC BROWING' appearing in the Official Gazette of January 30, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,915,372 to Atsushi Kano et al of Amagasaki, Japan for `PAPER FEEDING DEVICE' appearing in the Official Gazette of April 10, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,916,686 to Jack H. Bailey of Villa Park, Calif. for `SYSTEM FOR RECORDING DIGITAL INFORMATION IN A PULSE-LENGTH MODULATION FORMAT' appearing in the Official Gazette of April 10, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,919,052 to Yousuke Yoneda et al of Tokyo, Japan for `TRACK APPARATUS FOR A TOY RACING CAR' appearing in the Official Gazette of April 24, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,924,155 to Gunnar Hedlund et al of Sweden of `ENERGIZING SYSTEM FOR A VARIABLE RELUCTANCE MOTOR' appearing in the Official Gazette of May 8, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,930,908 to Hiroyuki Uchida et al of Japan for `SEALED ROLLING BEARING' appearing in the Official Gazette of June 5, 1990 should be deleted since no patent was granted."

"All reference to Patent No. 4,932,751 to Robert L. Byer et al of California for `CLADDINGS FOR SINGLE CRYSTAL OPTICAL FIBERS AND DEVICES AND METHODS AND APPARATUS FOR MAKING SUCH CLADDINGS' appearing in the Official Gazette of June 12, 1990 should be deleted since no patent was granted."

## Service by Publication

A petition to cancel the registration identified below having beeen filed, and the notice of such proceeding sent by certified mail to registrant at the last known address having been returned by the Postal Service as undeliverable, notice is hereby given that unless the registrant listed herein, its assigns or legal representatives shall enter an appearance within thirty days from the date of this publication, the cancellation will be proceeded with as in the case of default.

Block Walnut Processing Corporation, Nashville, Tenn, Reg. No. 951,084, for the mark "SUPER GRIT", Canc. No. 18,438.

JEAN BROWN
*Administrator of the*
*Trademark Trial and Appeal Board*
For JEFFREY M. SAMUELS
*Assistant Commissioner for Trademarks*

# PATENT NOTICES

**Certificates of Correction For Week of July 17, 1990**

| | | | |
|---|---|---|---|
| D. 304,511 | 4,826,680 | 4,846,560 | 4,855,959 |
| PP. 6,981 | 4,827,103 | 4,846,822 | 4,856,186 |
| Re. 32,986 | 4,828,182 | 4,847,852 | 4,856,285 |
| Re. 33,026 | 4,828,208 | 4,848,184 | 4,856,562 |
| 4,398,248 | 4,829,040 | 4,848,217 | 4,856,670 |
| 4,513,251 | 4,829,299 | 4,849,259 | 4,856,815 |
| 4,568,772 | 4,831,032 | 4,849,875 | 4,856,991 |
| 4,625,851 | 4,831,140 | 4,849,898 | 4,857,008 |
| 4,670,837 | 4,831,141 | 4,849,998 | 4,857,115 |
| 4,694,072 | 4,831,479 | 4,850,354 | 4,857,502 |
| 4,704,393 | 4,831,780 | 4,850,377 | 4,857,704 |
| 4,725,480 | 4,831,935 | 4,850,392 | 4,857,867 |
| 4,738,913 | 4,832,092 | 4,851,061 | 4,857,928 |
| 4,749,658 | 4,833,489 | 4,851,266 | 4,858,212 |
| 4,751,177 | 4,833,502 | 4,851,335 | 4,858,733 |
| 4,760,075 | 4,834,973 | 4,851,467 | 4,858,946 |
| 4,773,988 | 4,835,018 | 4,851,565 | 4,860,038 |
| 4,782,446 | 4,835,179 | 4,851,628 | 4,860,363 |
| 4,788,275 | 4,836,576 | 4,851,824 | 4,860,756 |
| 4,789,366 | 4,837,073 | 4,851,826 | 4,860,944 |
| 4,792,828 | 4,837,216 | 4,851,957 | 4,861,248 |
| 4,793,274 | 4,837,525 | 4,852,028 | 4,861,308 |
| 4,797,598 | 4,837,712 | 4,852,054 | 4,861,497 |
| 4,807,107 | 4,837,902 | 4,852,169 | 4,861,658 |
| 4,808,289 | 4,839,214 | 4,852,406 | 4,861,689 |
| 4,808,346 | 4,839,403 | 4,852,724 | 4,861,794 |
| 4,809,398 | 4,839,622 | 4,852,980 | 4,862,138 |
| 4,810,493 | 4,840,440 | 4,853,146 | 4,862,631 |
| 4,815,891 | 4,841,073 | 4,853,524 | 4,862,926 |
| 4,816,388 | 4,842,307 | 4,853,955 | 4,863,403 |
| 4,816,538 | 4,842,607 | 4,854,826 | 4,863,640 |
| 4,817,222 | 4,842,688 | 4,854,955 | 4,864,584 |
| 4,818,064 | 4,842,852 | 4,855,286 | 4,865,558 |
| 4,818,189 | 4,843,035 | 4,855,295 | 4,865,845 |
| 4,820,918 | 4,843,174 | 4,855,346 | 4,866,132 |
| 4,821,507 | 4,843,358 | 4,855,654 | 4,868,210 |
| 4,822,787 | 4,843,420 | 4,855,788 | 4,878,117 |
| 4,823,092 | 4,843,591 | 4,855,818 | 4,889,605 |
| 4,823,387 | 4,843,856 | 4,855,895 | 4,906,522 |
| 4,824,962 | 4,845,415 | 4,855,931 | |

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| Box Assignments | All assignment documents except those filed in new patent applications. |
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These patent collections, which are organized in patent number sequence, are available for use by the public free of charge. Each of the PDLs, in addition, offers supplemental reference publications of the U.S. Patent Classification System, including the *Manual of Classification, Index to the U.S. Patent Classification, Classification Definitions*, and provides technical staff assistance in their use to aid the public, in gaining effctive access to information contained in patents. CASSIS (Classification And Search Support Information System); which provides direct, on-line access to Patent and Trademark Office data, is available at all PDLs. Facilities for making paper copies of patents from either microfilm or paper collections are generally provided for a fee.

Since there are variations in the scope of patent collections among the PDLs and in their hours of service to the public, anyone contemplating use of the patents at a particular library is urged to contact that library, in advance, about its collection and hours in order to avert possible inconvenience.

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| | Boston Public Library | (617) 536-5400 Ext. 265 |
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| | Milwaukee Public Library | (414) 278-3247 |

# PATENT EXAMINING CORPS

JAMES E. DENNY, Acting Assistant Commissioner
STEPHEN G. KUNIN, Acting Deputy Assistant Commissioner
CONDITION OF PATENT APPLICATIONS AS OF May 19, 1990

| PATENT EXAMINING GROUPS | Actual Filing Date of Oldest New Case Awaiting Action |
|---|---|
| **CHEMICAL EXAMINING GROUPS** | |
| GENERAL METALLURGICAL, INORGANIC, PETROLEUM AND ELECTRICAL CHEMISTRY, AND ENGINEERING, GROUP 110—D. E. TALBERT, Director. | 7-7-87 |
| ORGANIC CHEMISTRY GROUP 120—JOHN F. TERAPANE, JR., Director | 10-18-88 |
| SPECIALIZED CHEMICAL INDUSTRIES AND CHEMICAL ENGINEERING, GROUP— 130 BARRY S. RICHMAN, Director | 5-12-88 |
| HIGH POLYMER CHEMISTRY, PLASTICS, COATING, PHOTOGRAPHY, STOCK MATERIALS AND COMPOSITIONS, GROUP 150—J. O. THOMAS, Director | 4-5-88 |
| BIOTECHNOLOGY, GROUP 180—J. E. KITTLE, Director | 1-28-87 |
| **ELECTRICAL EXAMINING GROUPS** | |
| INDUSTRIAL ELECTRONICS, PHYSICS AND RELATED ELEMENTS, GROUP 210—D. G. Kelly, Director | 10-15-87 |
| SPECIAL LAWS ADMINISTRATION, GROUP 220—ROBERT E. GARRETT, Director | 2-27-87 |
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| PACKAGES, CLEANING, TEXTILES, AND GEOMETRICAL INSTRUMENTS, GROUP 240—TRYGVE M. BLIX, Director | 11-9-88 |
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| COMMUNICATIONS, MEASURING, TESTING AND LAMP/DISCHARGE GROUP, GROUP— 260 STEWART LEVY, Acting Director | 3-31-88 |
| DESIGN, GROUP 290—ROBERT E. GARRETT, Director | 2-6-86 |
| **MECHANICAL EXAMINING GROUPS** | |
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| MATERIAL SHAPING, ARTICLE MANUFACTURING AND TOOLS, GROUP 320—N. GODICI, Acting Director | 6-23-88 |
| MECHANICAL TECHNOLOGIES AND HUSBANDRY PERSONAL TREATMENT INFORMATION, GROUP 330—J. J. LOVE, Director | 10-25-88 |
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| GENERAL CONSTRUCTIONS, PETROLEUM AND MINING ENGINEERING, GROUP 350— A. L. SMITH, Director | 5-5-89 |

**Expiration of patents**: The patents within the range of numbers indicated below expire during May 1990 except those which may have had their terms curtailed by disclaimer under the provisions of 35 U.S.C. 253. Other patents, issued after the dates of the range of numbers indicated below, may have expired before the full term of 17 years for the same reasons, or have lapsed under the provisions of 35 U.S.C. 151.

Patents ..... Numbers 3,729,744 to 3,736,594 inclusive
Plant Patents ..... 3,321 to 3,349 inclusive

# REEXAMINATIONS

JULY 17, 1990

Matter enclosed in heavy brackets [ ] appears in the patent but forms no part of this reexamination specification; matter printed in italics indicates additions made by reexamination.

**B2 4,264,083 (1324th)**
**SPLASH GUARD**

**Kenneth S. Matthew, Northbrook, and Harry J. Dickey, Bellwood, both of Ill., assignors to Custom Accessories, Inc.**

**Reexamination Request No. 90/001,798, Jun. 22, 1989.**
**Reexamination Certificate for Patent No. 4,264,083, issued Apr. 28, 1981, Ser. No. 68,729, Aug. 22, 1979.**
**Reexamination Certificate B1 4,264,083, issued Mar. 22, 1983.**
**Int. Cl.[3] B62B *9/16***
**U.S. Cl. 280—851**

**AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:**

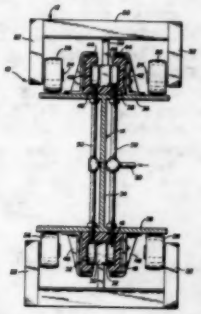
The patentability of claims **1–20** is confirmed.

**1.** A splash guard or mud flap assembly for attachment to the fender of a motor vehicle, comprising: a flexible, splash-intercepting body portion; resilient, self-sustaining anchoring means for supporting the body portion and being adapted to be snugly engaged along the fender of a motor vehicle for securing the body portion in a splash-intercepting position thereon, said anchoring means including a front wall and a back wall resiliently integrally joined along one side in substantial overlying relation to one another and converging in the direction of the free ends thereof, the free ends of said walls being resiliently separable a distance to enable the anchoring means to be snugly frictionally engaged on a motor vehicle fender, the resiliency of the anchoring means being such that the front wall and the back wall thereof provide substantially the total gripping force for maintaining the anchoring means on a motor vehicle fender while providing a rigid support base for the splash-intercepting body portion of the splash guard,and an outwardly extending pin-like member carried on the front wall of the resilient anchoring means in spaced, inward relation to the free ends of said walls of the anchoring means for engaging and retaining said body portion on the anchoring means, said pin-like member being provided with locking means for securing and maintaining the splash-intercepting body portion on the anchoring means, said locking means being characterized in that it overlies and is in contact with a sufficient area of the splash-intercepting body portion to resist any forces tending to dislodge said body portion from the pin-like member.

**B1 4,438,842 (1325th)**
**SLIDE CONVEYOR WITH SIDE STABILIZERS**

**Robert L. Alldredge, 130 Pearl St., Apt. 1108, Denver, Colo. 80203, and Robert J. Deltour, 16227 E. Arkansas Dr., Aurora, Colo. 80012**

**Reexamination Request No. 90/001,847, Sep. 25, 1989.**
**Reexamination Certificate for Patent No. 4,438,842, issued Mar. 27, 1984, Ser. No. 401,916, Jul. 26, 1982.**
**Continuation of Ser. No. 74,345, Sep. 11, 1979, abandoned.**
**Int. Cl.[5] B65G *15/60***
**U.S. Cl. 198—838**



**AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:**

Claims **1** and **11** are determined to be patentable as amended.

Claims **2–10** and **12**, dependent on an amended claim, are determined to be patentable.

**1.** An improved conveyor of the type having a convoluted longitudinally extending belt adapted to follow a laterally and vertically curved path and a conveyor chain capable of both lateral and vertical bending with the path of the belt, wherein the improvement comprises:

(a) a longitudinally extending conveyor track assembly carrying a longitudinally oriented chain slide surface defining substantially the full length of the operational conveyor path and having a bottom and opposite side walls thereon, and carrying on each lateral side of the slide surface a stabilizer operating surface;

(b) a belt carriage connected to the conveyor belt and extending transversely thereto, having a central connecting means for joining the carriage to a single conveyor chain substantially at the transverse center of the belt and having a pair of laterally [speced] *spaced* stabilizer means flanking said central connecting means and overlying the stabilizer operating surfaces when the chain overlies said slide surface bottom wall, the stabilizer means being oriented with respect to the central connecting means and chain such that at substantially any point along the length of the chain slide surface when the carriage is laterally evenly weighted the chain is in force bearing contact with said slide surface and the stabilizer means are without force bearing contact with said stabilizer operating surfaces; and

(c) wherein the chain is of the type formed from pin links and intermediate block links, the central connecting

means being joined only to the block links, the block links being of the type having a transverse hole at each end thereof for receiving the pin of a pin link and the hole being sufficiently larger in diameter than the pin that the block link is capable of a predetermined degree of lateral tilting before the block link applies twisting torque to the pin, and wherein the stabilizer means are oriented with respect to the central connecting means such that a stabilizer means will contact an operating surface in force bearing relationship when the carriage is laterally unevenly [wieghted] *weighted* prior to the time that a block link applies substantial twisting torque to a pin.

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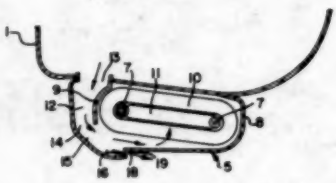
**B1 4,537,160 (1326th)**

**AIR CLEANER FOR AN AIR-COOLED ENGINE**

**Tetsuaki Shirai, Kobe, Japan, assignor to Kawasaki Heavy Industries Ltd, Kobe, Japan**

**Reexamination Request No. 90/001,885, Nov. 6, 1989.**
**Reexamination Certificate for Patent No. 4,537,160, issued Aug. 27, 1985, Ser. No. 638,736, Aug. 8, 1984.**
**Claims priority, application Japan, Aug. 12, 1983, 58-125955**
**Int. Cl.[5] F01P *5/06***
**U.S. Cl. 123—41.58**



**AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:**

Claims **1, 5,** and **7** are cancelled.

Claims **2, 4** and **6** are determined to be patentable as amended.

Claim **3**, dependent on an amended claim, is determined to be patentable.

New claims **8** and **9** are added and determined to be patentable.

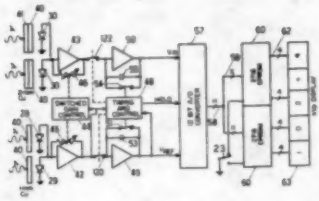
**[1.** An air cleaner for an air-cooled engine, the engine further including a cooling fan within a fan housing and the fan housing having an air outlet formed therein, said cleaner comprising a casing adapted to be attached to said fan housing, said casing having a side wall, an air inlet opening in said casing which is adapted to communicate with said air outlet of the fan housing and air flowing from said fan, through said air outlet and said air inlet opening and into said casing, an air passage formed within said casing and extending from said inlet opening along said side wall and air from said fan flowing through said passage, an air filter in said air passage, said passage including a curved portion between said air inlet opening and said air filter, and a slit opening formed in said side wall adjacent said curved portion.**]**

**B1 4,697,280 (1327th)**

**METHOD AND APPARATUS FOR THE MEASUREMENT OF X-RAY SOURCES**

**William C. Zarnstorff, and Frank N. Ranallo, both of Madison, Wis., assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Reexamination Request No. 90/001,711, Feb. 7, 1989.**
**Reexamination Certificate for Patent No. 4,697,280, issued Sep. 29, 1987, Ser. No. 648,020, Sep. 6, 1984.**
**Int. Cl.[5] G01D *18/00***
**U.S. Cl. 378—207**



**AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:**

The patentability of claims **1–10, 12, 14–17, 19–26** is confirmed.

Claims **11, 13, 18** are cancelled.

New claims **27–30** are added and determined to be patentable.

**1.** Apparatus for the measurement of the characteristics of an X-ray beam from an X-ray machine comprising:

(a) first detector unit means for providing an output signal related to the intensity of the X-ray radiation incident on it which passes through an X-ray filter of a first attenuation characteristic;

(b) second detector unit means, adjacent to the first detector unit means, for providing an output signal related to intensity of the X-ray radiation incident on it which passes through an X-ray filter of a second attenuation characteristic different than that of the X-ray filter for the first detector unit means;

(c) first integrator means for integrating the signal from the first detector means and providing an output signal indicative thereof;

(d) second integrator means for integrating the signal from the second detector means and providing an output signal indicative thereof;

(e) conversion means for determining the ratio of the integrated first detector signal and the integrated second detector signal and providing a multi-bit digital output signal on parallel lines;

(f) memory means, having address input lines connected to the parallel output lines from the conversion means, for providing an output of data stored at an address location corresponding to the multi-bit input signal on the address lines such that the output data from the memory means is indicative of a selected characteristic of the X-ray beam received by the first and second detector unit means;

(g) display means for receiving the output data signal from the memory means and for providing a display to an operator which corresponds to the data from the memory means; and

(h) timing and control means for determining when the magnitude of the output signal of the first integrator means exceeds a predetermined level and thereafter hold-

ing the output signal levels of the first and second integrator means constant to allow such levels to be readily compared by the conversion means to determine a ratio output signal which remains substantially constant.

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**B1 4,767,628 (1328th)**

## CONTINUOUS RELEASE PHARMACEUTICAL COMPOSITIONS

**Francis G. Hutchinson, Lymm, United Kingdom, assignor to Imperial Chemical Industries PLC, London, England**

**Reexamination Request No. 90/001,713, Feb. 8, 1989.**

**Reexamination Certificate for Patent No. 4,767,628, issued Aug. 30, 1988, Ser. No. 68,760, Jun. 29, 1987.**

**Continuation of Ser. No. 640,855, Aug. 15, 1984, abandoned, which is a continuation of Ser. No. 344,722, Feb. 1, 1982, abandoned.**

**Claims priority, application United Kingdom, Feb. 16, 1981, 8104734**

**Int. Cl.**[5] **A61K** *9/26, 9/32*

**U.S. Cl. 424—426**

AS A RESULT OF REEXAMINATION, IT HAS BEEN DETERMINED THAT:

Claim 1 is determined to be patentable as amended.

Claims 2–17, dependent on an amended claim, are determined to be patentable.

1. A pharmaceutical composition [comprising] *for essentially monophasic continuous release of a polypeptide in the form of an implant or suspension for injection consisting essentially of* (a) from 50% to 99.999% of a polylactide which is a polymer of lactic acid alone, a copolymer of lactic acid and glycolic acid wherein the ratio of glycolide to lactide units is from 0 up to 3:1, a mixture of such polymers, a mixture of such copolymers, or a mixture of such polymers and copolymers, the lactic acid being either in racemic or in optically active form, and such polylactide being either soluble in benzene and having an inherent viscosity of from 0.093 (1 g. per 100 ml. in chloroform) to 0.5 (1 g. per 100 ml. in benzene), or insoluble in benzene and having an inherent viscosity of from 0.093 (1 g. per 100 ml in chloroform) to 4 (1 g. per 100 ml in chloroform or dioxan), and (b) from 0.001% to 50% of a pharmacologically active polypeptide which has a molecular weight *of* at least about the same as the molecular weight of tetragastrin, which is not significantly hydrolyzed under the conditions encountered within the composition during the period of use envisioned, and which contains four or more amino acid residues, said polypeptide being uniformly dispersed in said polylactide *so that some of the said polypeptide is present at the external surface of the composition*, which composition, when placed in an aqueous physiological-type environment absorbs water and exhibits two successive phases of release of polypeptide, the first phase being release by initial diffusion through aqueous polypeptide domains communicating with the exterior surface of the composition, and the second phase being release consequent upon degradation of the polylactide, characterized in that the diffusion phase and the degradation-induced phase overlap in time, said composition being further characterized by the fact that, when placed in an aqueous physiological type environment, water diffuses into the matrix and is partitioned between polypeptide and polylactide to form aqueous polypeptide domains, the said domains increasing with increasing absorption of water until the continuity of the said domains reaches a sufficient level to communicate with the exterior surface of the composition, whereupon polypeptide starts to be released from said composition by diffusion through aqueous polypeptide channels formed from said domains, which second phase continues until substantially all of the remaining polypeptide is released *over at least a week*.

# REISSUES

## JULY 17, 1990

Matter enclosed in heavy brackets [ ] appears in the original patent but forms no part of this reissue specification; matter printed in italics indicates additions made by reissue.

### Re. 33,262
### AUTOMATED TURRET LATHE

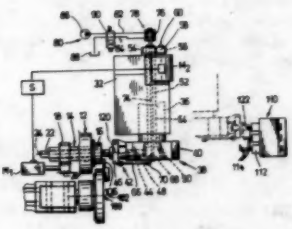
**Helmut F. Link, Aichwald, and Walter Grossmann, Baltmannsweiler, both of Fed. Rep. of Germany, assignors to Index Werke Komm.-Ges Hahn & Tessky, Esslingen, Fed. Rep. of Germany**

**Original No. 4,589,311, dated May 20, 1986, Ser. No. 549,346, Nov. 4, 1983. Application for reissue Apr. 13, 1988, Ser. No. 181,212**

**Claims priority, application Fed. Rep. of Germany, May 4, 1983, 3316288**

**Int. Cl.**[5] **B23B** *29/32, 13/04*

**U.S. Cl. 82—120** **14 Claims**



*5. An automatic turret lathe comprising a main rotatable spindle; means for rotatably mounting said spindle for rotation about a main spindle axis; drive means associated with said main spindle for rotatably driving the same about said main axis; a first workpiece chuck means associated with said main spindle and rotatable therewith; a first tool carrier comprising a tool turret rotatably mounted about an indexing axis; a second workpiece chuck means mounted on the first tool carrier turret for rotation about an auxiliary spindle axis; a second tool carrier for machining a workpiece held by said first chuck means located adjacent the latter for movement relative to a workpiece held by the first chuck means; a stationary third tool carrier disposed on the side of said first tool carrier facing away from said first chuck means; said third tool carrier carrying at least one tool holder; and cross slide means on which said first tool carrier is rotatably mounted for movement of said turret along axes normal and parallel to said main spindle axis so that by appropriate adjustment of said slide means and appropriate indexing of said tool turret said auxiliary spindle axis can be brought into axial alignment with said main spindle axis and a workpiece held by said second chuck means may approach each tool holder of the third tool carrier.*

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### Re. 33,263
### TAMPERPROOF CABINET

**Steve F. Goodman, Wyoming, Mich., assignor to Herman Miller, Inc., Zeeland, Mich.**

**Original No. 4,722,285, dated Feb. 2, 1988, Ser. No. 30,677, Mar. 26, 1987. Continuation of Ser. No. 810,035, Dec. 17, 1985, abandoned. Application for reissue Jun. 26, 1989, Ser. No. 371,600**

**Int. Cl.**[5] **E05G** *1/04;* **A47C** *43/00*

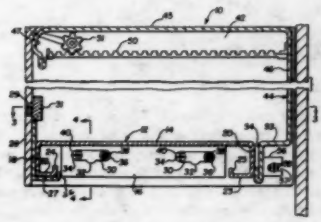
**U.S. Cl. 109—50** **12 Claims**

1. A storage cabinet adapted for mounting on a wall and including side panels, a top panel, a bottom panel, a back panel, and a door for closing an opening between said top panel, bottom panel, and side panels, all of said panels and door being joined together to define an enclosed space, said bottom panel is removably joined to said side panels through exposed fasteners outside said enclosed space and extending through said bottom panel and side panels, the improvement which comprises:

a slot in one of said bottom panel and side panels for retaining said exposed fasteners when said bottom panel is in a forward position with respect to said side panels;

one of said exposed fasteners mounted in an end portion of said slot to prevent forward movement of said bottom panel with respect to said side panel, said one fastener being secured to the other of said bottom panel and side panels in a non-removable fashion by which said one exposed fastener cannot ordinarily be removed without evident damage to said other of said bottom panel and side panels;

means including said back wall to prevent movement of said bottom panel from said forward position to said rearward position when said cabinet is assembled;



whereby said bottom panel can be removed from said side panels in the absence of said back panel by sliding said bottom panel rearwardly with respect to said side panels when all said fasteners except said one non-removable fasteners are removed; and

means to secure said back panel to said side panels, said securing means being inaccessible when said cabinet is mounted to said wall and being accessible for removing said back wall from said side panels when said cabinet is removed from said wall;

whereby said bottom panel cannot be removed from said side panels while said cabinet is mounted to said wall without evident damage to the other of said bottom panel and side panels, thus preventing disassembly of said cabinet when said door is locked in said opening without evidence of tampering.

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### Re. 33,264
### BAG PACK

**William H. Baxley; Marion H. Weatherford; Harry B. Wilfong, Jr., and Floyd B. Williams, all of Hartsville, S.C., assignors to Sonoco Products Company, Hartsville, S.C.**

**Original No. 4,676,378, dated Jun. 30, 1987, Ser. No. 853,589, Apr. 18, 1986. Application for reissue Jun. 21, 1989, Ser. No. 369,459**

**Int. Cl.**[5] **B65D** *1/34*

**U.S. Cl. 206—554** **23 Claims**

*21. A system for mounting a pack of thermoplastic grocery bags of the T-shirt type on a rack, for supporting consecutive bags from said pack on said rack in an open loading position and for facilitating easy removal of the consecutive loaded bags from said rack; said system comprising:*

*a bag pack comprising a plurality of stacked T-shirt type bags secured together, each of said bags comprising*

*front and rear wall portions integrally connected at sides thereof*

*and secured together at the bottom thereof and defining an open top mouth portion,*

*laterally spaced handles integral with said wall portions and extending upwardly from opposed sides of said mouth portion,*

*a support rod receiving aperture formed through an intermediate portion of each of said handles,*

*a detachable mounting tab extending upwardly from each of said front and rear wall portions at a central area of said mouth portion,*

*a mounting aperture in each of said detachable mounting tabs, and*

*means bonding said tabs together for maintaining said bags together in said pack; and*

*a rack comprising*

*a generally horizontal base,*

*generally vertical frame members mounted on and extending from one side of said base,*

*two laterally spaced generally horizontal support rod means having free outer ends and carried by and extending outwardly from the upper portion of said vertical frame members (1) for slidably receiving said apertures in said bag handles of said pack, (2) for supporting consecutive ones of said bags in an open loading position as said bags are consecutively removed from said pack and slid along said support rods and (3) for facilitating removal of loaded bags by sliding said handles off said support rods at said free outer ends, and*

*retaining means carried by the upper portion of said vertical frame members between said support rod means and extending outwardly therefrom a distance less than the extension of said support rod means (1) for receiving said apertures in said detachable mounting tabs, (2) for cooperating with said support rod means to mount said bag pack on said rack and (3) for allowing consecutive detachment of said front and rear wall portions of said bags from said mounting tabs as said bags are slid outwardly along said support rod means into the open loading position by retaining said mounting tabs on said retaining means.*

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**Re. 33,265**

## TAMPER-INDICATING CLOSURE, CONTAINER AND COMBINATION THEREOF

**James L. Gregory, Toledo, and Steven R. Wolfe, Maumee, both of Ohio, assignors to Owens-Illinois Closure Inc., Toledo, Ohio**

**Original No. 4,613,052, dated Sep. 23, 1986, Ser. No. 728,377, Apr. 29, 1985. Application for reissue Apr. 25, 1988, Ser. No. 185,717**

**Int. Cl.[5] B65D *41/34***

**U.S. Cl. 215—252** **7 Claims**

*8. A screw cap for closing the open upper finish of a container comprising a generally disc-shaped top with an integral, cylindrical, depending skirt, a generally cylindrical flexible, indicating band attached to the annular bottom of said skirt by a plurality of circumferentially spaced, frangible bridging members, a full annular stop ring formed integrally with the indicating band and attached to the interior thereof, said stop ring being positioned inwardly and upwardly with respect to the interior of said indicator band, an integral downwardly curved ring portion extending radially inwardly and axially downwardly from the inside portion of said band to said stop ring, the upper edge of said stop ring being thicker than the lower end which is connected to said curved hinge portion, said hinge portion being constructed and arranged such that the lower end of said stop ring is spaced from the inside surface of said band and said upper edge of said stop ring is capable of flexing into contact with the inner surface of said band*

*during application of said closure to said container, and said stop ring adapted to engage beneath an element of the container and prevent the ring from passing the container element after assembly of the closure on a container.*

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**Re. 33,266**

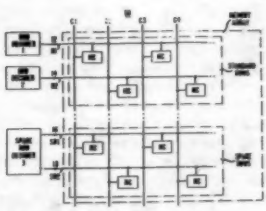
## FOLDED BIT LINE MEMORY WITH ONE DECODER PER PAIR OF SPARE ROWS

**Austin C. Dumbri, Palmer Township, Northampton County, Pa., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Original No. 4,494,220, dated Jan. 15, 1985, Ser. No. 444,239, Nov. 24, 1982. Application for reissue Jan. 15, 1987, Ser. No. 4,393**

**Int. Cl.[5] G11C *11/40***

**U.S. Cl. 365—200** **12 Claims**



*7. A semiconductor memory comprising:*

*an array of standard memory cells arranged in a folded bit line configuration of even and odd rows and columns and an array of spare memory cells arranged in a folded bit line configuration of rows;*

*a row decoder circuit being coupled to each row of standard memory cells, each decoder circuit including means for decoupling same from the associated row of standard memory cells;*

*a single separate spare row decoder circuit being coupled to one even and to one odd row of spare memory cells, each spare decoder circuit including first means for decoupling same from one or both of the associated rows of spare memory cells; and*

*each spare row decoder circuit includes second means for providing same with the address of a row decoder circuit which has been decoupled from the associated row such that the spare row is effectively substituted for the standard row.*

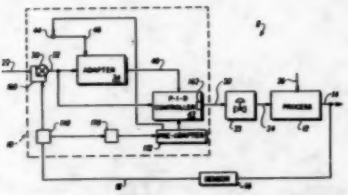
## Re. 33,267
## PATTERN-RECOGNIZING SELF-TUNING CONTROLLER

**Thomas W. Kraus, Foxboro, Mass., assignor to The Foxboro Company, Foxboro, Mass.**

**Original No. 4,602,326, dated Jul. 22, 1986, Ser. No. 560,617, Dec. 12, 1983. Application for reissue Jul. 21, 1988, Ser. No. 226,245**

**Int. Cl.[5] G05B** *13/02, 13/00*

**U.S. Cl. 364—158** **66 Claims**



2. [The apparatus of claim 1 wherein said pattern characteristic includes] *A pattern-recognizing self-tuning controller apparatus for use in a control system, wherein said controller apparatus includes a controller which is coupled to a process in a closed loop of said control system for controlling a process controlled variable having set point and measured values, said controller having a control action which is determined by at least one operating parameter so that the controller is responsive to a difference between said set point and measured values; said controller apparatus comprising:*

*first comparator means responsive to differences between said set point and measured values for generating a closed-loop behavior signal;*

*detector means responsive to the closed-loop behavior signal of said process control variable for measuring a pattern characteristic thereof and producing a measured value of said pattern characteristic, the latter including* a first characteristic being a peak amplitude of a local extremum of said behavior signal and a second characteristic being an amplitude of said behavior signal at a point subsequent to said local extremum;

*second comparator means being coupled to said detector means and operating to compare said pattern characteristic measured value with a predetermined desired value for the pattern characteristic; and*

*adjusting means coupled to said second comparator means for responding to a difference between said measured and desired values of the pattern characteristic so that the measured value substantially matches the set point value, said adjusting means not operating to alter said operating parameter of the controller when the difference between said measured and desired values is less than a prescribed difference;* and [said controller apparatus further includes:]

means coupled to said detector means for combining said first and second characteristics to produce a measured value of said performance criterion.

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## Re. 33,268
## CHIP CARRIER SOCKET HAVING IMPROVED CONTACT TERMINALS

**Dimitry G. Grabbe, Middletown, and Iosif Korsunsky, Harrisburg, both of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Original No. 4,645,279, dated Feb. 24, 1987, Ser. No. 827,133, Feb. 6, 1986. Continuation-in-part of Ser. No. 584,274, Feb. 27, 1984, abandoned. Application for reissue Feb. 21, 1989, Ser. No. 313,229**

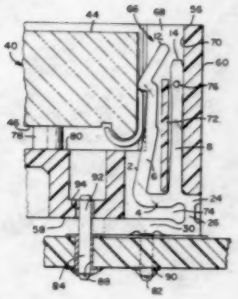
**Int. Cl.[5] H01R** *23/72*

**U.S. Cl. 439—70** **34 Claims**

*18. A contact terminal of the type having a contact arm and a mounting portion, the contact arm having a contact portion for disengageably contacting a contact surface on an electrical device such as a chip carrier, the mounting portion intended for mounting on a substrate and being engageable with a conductor on the substrate, the contact terminal being characterized in that:*

*the terminal has oppositely facing parallel major surfaces and edge surfaces extending between the major surfaces;*

*the terminal comprises a web portion having first and second arms extending therefrom in spaced apart, side-by-side relationship, the arms having free ends which are spaced from the web portion;*



*the first arm being a contact arm, the contact portion being adjacent to the free end thereof, the second arm having a bearing portion;*

*the contact portion and the bearing portion being edge surface portions of the first and second arms respectively which face in opposite lateral directions;*

*the mounting portion being spaced from the web portion and being connected to the web portion by a pivot arm connecting neck.*

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## Re. 33,269
## PROCESS FOR THE TREATMENT OF LINEAR LOW DENSITY POLYETHYLENE BY ORGANIC PEROXIDES WHICH GENERATE FREE RADICALS

**Jean-Paul Thiersault, Saint Mitre les Remparts; Alain Senez, Callas-Cabries, and Jean L. Vidal, Martigues, all of France, assignors to The British Petroleum Company p.l.c., London, United Kingdom**

**Original No. 4,460,750, dated Jul. 17, 1984, Ser. No. 392,021, Jun. 25, 1982. Application for reissue Nov. 4, 1988, Ser. No. 267,548**

**Claims priority, application France, Jun. 22, 1981, 81 12184**

**Int. Cl.[5] C08F** *8/00*

**U.S. Cl. 525—333.8** **7 Claims**

1. A process for treating co-polymers of linear low density polyethylene having a density of less than 0.935, a fluidity index at 190° C. under 2.16 kg as per NFT 51016 standard, Method A, of between 0.3 and 50, and a branching index greater than 0.95, in which the co-polymer is obtained by *a gaseous phase* copolymerization under a pressure less than 4 $MP_a$, of a mixture of ethylene and *4 to 20 percent by weight of* a higher $C_{3-8}$ alpha-olefin [containing 4 to 20 percent by weight of the higher alpha-olefin], *in the presence of a catalyst containing a compound of a transition metal of sub-groups IVa, Va and VIa of the Periodic Table of Elements, the said catalyst being activated by an organometallic compound, this process* comprising treating the co-polymer thermomechanically in the molten state at a temperature less than 220° C., in the presence of an organic peroxide which produces free radicals, in which the organic peroxide is employed in an amount within the range of 0.005% to 1% by weight of the co-polymer, such that the treated co-polymer has a branching index within the range of 0.8 to 0.95 and its gelling rate, as measured by extraction with boiling xylene, is zero.

# PLANT PATENTS

## GRANTED JULY 17, 1990

Illustrations for plant patents are usually in color and therefore it is not practicable to reproduce the drawing.

### 7,270
### FUCHSIA×HYBRIDA CV. ISLAND SUNSET

**Geoff Schwyn, Delta, Canada, assignor to Monrovia Nursery Company, Azusa, Calif.**

**Filed Aug. 30, 1988, Ser. No. 238,280**
**Int. Cl.[5] A01H *5/00***
**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct selection of Fuchsia×hybrida as substantially shown and described herein, that is characterized particularly as a novelty by the unique combination of multicolored foliage, red and purple flowers and cold hardiness.

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### 7,271
### VARIETY OF GERANIUM NAMED SIMONE

**Jacques Guillou; Bernard Guillou, and Maurice Guillou, all of Saint-Malo, France, assignors to Etablissement Guillou Freres Jacques, Bernard et Maurice, France**

**Filed Jun. 1, 1989, Ser. No. 360,014**
**Claims priority, application France, Aug. 29, 1988, 7944**
**Int. Cl.[5] A01H *5/00***
**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct ivy geranium plant as shown and described herein, and characterized in heat tolerance both indoors and out, vegetative growth is not as affected by high temperatures and the bloom burns less than is typical of this dark red color, the plant body is strong and full in habit, the cuttings are more readily available and root much faster than the current varieties, and the deep, rich red color of the semi-double bloom appear velvet-like atop medium green foliage creating a full yet attractive hanging basket.

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### 7,272
### LILIUM "ROYAL DUTCH"

**Gerardus C. Van der Salm, Rte. 4, Box 422, Woodland, Wash. 98674**

**Filed May 9, 1989, Ser. No. 350,019**
**Int. Cl.[5] A01H *5/00***
**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinctive variety of Asiatic hybrid lily plant substantially as herein shown and described, characterized by its large size and thickness of its melon orange flowers with their slightly undulating tepal margins and spotting on basal third of each tepal.

### 7,273
### VARIETY OF GERANIUM NAMED GIGI

**Jacques Guillou; Bernard Guillou, and Maurice Guillou, all of Saint-Malo, France, assignors to Etablissement Guillou Freres Jacques, Bernard et Maurice, France**

**Filed Jun. 1, 1989, Ser. No. 360,013**
**Claims priority, application France, Apr. 11, 1989, 8530**
**Int. Cl.[5] A01H *5/00***
**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinct variety of ivy geranium plant as shown and described herein, and characterized by a full plant habit resulting in higher cutting production, a more compact plant form than the current market varieties, a fuller plant, the single salmon-coral florets accent the medium green foliage and much more heat tolerant and self-cleaning than those ivies currently sold.

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### 7,274
### LILIUM ANTARCTICA

**Gerardus C. Van der Salm, Rte. 4, Box 422, Woodland, Wash. 98674**

**Filed May 10, 1989, Ser. No. 350,123**
**Int. Cl.[5] A01H *5/00***
**U.S. Cl. Plt.—68** **1 Claim**

1. A new and distinctive variety of Asiatic hybrid lily plant substantially as herein shown and described, characterized by its truly white upfacing flowers with a slight flush of green extending from the nectaries and narrow ring of deep magenta spots in the center of the flower.

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### 7,275
### POINSETTIA PLANT '268'

**Franz Fruehwirth, Encinitas, Calif., assignor to Paul Ecke Ranch, Inc., Encinitas, Calif.**

**Filed Oct. 27, 1988, Ser. No. 263,155**
**Int. Cl.[5] A01H *5/00***
**U.S. Cl. Plt.—86** **1 Claim**

1. A new and distinct Poinsettia cultivar, substantially as herein shown and described, distinguished by its large, bright red, flower bracts which tend to remain erect, and its self-branching traits.

# PATENTS

## GRANTED JUL. 17, 1990

### ERRATA

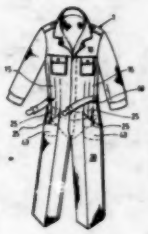
| For CLASS | See PATENT NO. |
|---|---|
| 475-128 | 4,941,370 |
| 600-028 | 4,941,453 |
| 606-059 | 4,941,481 |
| 227-019 | 4,941,623 |
| 229-117 | 4,941,624 |
| 220-001 | 4,941,653 |
| 271-209 | 4,941,654 |
| 271-242 | 4,941,655 |
| 271-278 | 4,941,656 |
| 271-293 | 4,941,657 |
| 293-155 | 4,941,701 |
| 414-695 | 4,941,786 |
| 412-007 | 4,941,804 |
| 552-230 | 4,941,898 |
| 204-298 | 4,941,915 |
| 503-227 | 4,941,141 |
| 505-001 | 4,492,141 |
| 514-222 | 4,492,143 |
| 528-070 | 4,492,164 |
| 558-411 | 4,492,250 |
| 332-124 | 4,492,374 |
| 355-256 | 4,492,475 |
| 367-137 | 4,492,560 |
| 360-025 | 4,492,609 |
| 361-309 | 4,492,610 |
| 364-474 | 4,492,611 |
| 361-049 | 4,492,612 |
| 364-557 | 4,492,613 |
| 364-571 | 4,492,614 |
| 364-578 | 4,492,615 |

# PATENTS

## GRANTED JULY 17, 1990

## GENERAL AND MECHANICAL

**4,941,209**
**UNITARY GARMENT**
**Rosemary J. George, 9008 Beverly Hill, Houston, Tex. 77063**
**Filed Dec. 30, 1988, Ser. No. 292,320**
**Int. Cl.[5] A41D *13/02***
**U.S. Cl. 2—79** **20 Claims**



19. A unitary garment comprising:

a. an upper portion having a front panel and a back panel adapted to enclose the upper portion of a human torso;

b. a lower portion having a front panel and a back panel and adapted to enclose the lower portion of a human torso and at least the upper portion of the legs, the front panel of said upper portion being integral with the front panel of said lower portion;

c. a separate side pocket along each side of the front panel of said lower portion proximate the upper portion;

d. a drop-seat panel having a bottom edge permanently joined to the back panel of said lower portion, a top edge, and two side edges, each side edge configured to be in a position proximate the side pocket on its respective side of the garment when the drop-seat panel is in its closed position;

e. a separate fastener associated with each side pocket adapted to fasten the side edge of the drop-seat panel, proximate its respective side pocket to the front panel of said lower portion of the garment wherein closure occurs along the front of said garment in the area of the side pocket and such that the resulting fastened side edge is effectively concealed by its position relative to its respective side pocket;

f. a tuck panel attached to the back panel of the upper portion which continues below the upper portion and defines a brief including a separable center seam, said brief being detachably secured proximate the crotch area in the front panel of the lower portion.

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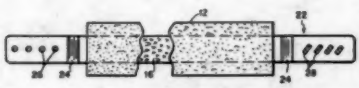
**4,941,210**
**QUICK-CHANGE SWEAT BAND**
**George J. Konucik, P.O. Box 9482, Richmond, Va. 23228**
**Filed Dec. 2, 1988, Ser. No. 278,761**
**Int. Cl.[5] A42C *5/02***
**U.S. Cl. 2—171** **1 Claim**



1. A quick change sweat band comprising:

(a) a central head band portion consisting of a long, narrow continuous width belt of flexible material having an inside surface, an outside surface, a top edge, a bottom edge, and first and second ends;

(b) a first narrow, flexible end portion having a width equal to the width of said belt and having a plurality of equally spaced openings centrally located along the length of said first end portion and extending from the first end of said belt;

(c) a second narrow, flexible end portion having a width equal to the width of said belt and having a plurality of equally spaced projecting knobs centrally located along the length of said second end portion and extending from the second end of said belt, the spacing of said projecting knobs being the same as the spacing of said openings;

(d) first and second pieces of flexible, stretchable material of the same width as said belt and extending a short distance along the length of said belt connected respectively between said first and second end portions and the first and second ends of said belt;

(e) a first fastener material of the hook and loop pile type secured to the inside surface of said belt;

(f) an absorbent pad having a front side and rear side and having a width slightly larger than the width of said belt, said pad having attached on the rear side thereof a second fastener material of the hook and pile type of the opposite type from said first fastener material, the second fastener material of said absorbent pad being adapted to removably engage the first fastener material secured to said belt whereby said pad extends a short distance beyond the top and bottom edges of said belt; and

(g) the first and second end portions of said sweat bend being removably engagable whereby at least one of said projecting knobs is secured within one of said openings to form the sweat band into an adjustable loop of variable circumference adapted to maintain the front side of the absorbent pad against the wearer's head to absorb perspiration, said absorbent pad being removable and replaceable.

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**4,941,211**
**COLD WEATHER HOOD**
**Morton Blutstein, Milwaukee, Wis., assignor to Reliable Knitting Works, Milwaukee, Wis.**
**Filed Apr. 14, 1989, Ser. No. 337,959**
**Int. Cl.[5] A42B *1/04, 3/18***
**U.S. Cl. 2—202** **5 Claims**

1. A cold weather hood which is worn on an individuals head comprising:

a hood member adapted to cover the wearer's head, the hood member having an opening for the face of the wearer; and

a face mask manufactured from double-sided, brushed polyester fiber, the face mask being secured in the opening of the hood member and for covering the face of the wearer.

4,941,212

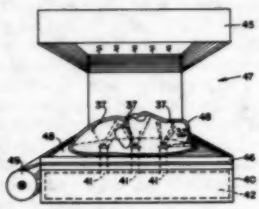
## METHOD OF MAKING A FACE MASK AND APPLYING THE FACE MASK TO THE HEAD

Lawrence J. Liff, 6502 N. Central, Phoenix, Ariz. 85012

Continuation-in-part of Ser. No. 143,861, Apr. 25, 1980, abandoned. This application Aug. 4, 1982, Ser. No. 405,286

Int. Cl.[5] A41G *7/02*

U.S. Cl. 2—206 13 Claims



7. The method of making up a human face including the steps of selecting an integral one-piece shell of synthetic resinous material which has been shaped to a configuration to closely conform to the face of a human, said synthetic resinous material of said shell consisting essentially of a closed-cell, cross-linked polyethylene foam and being of a thickness of between 1/64 and ¼ inch and having a density of between 1¤ and 9 pounds per cubic foot, providing said shell with the desired appearance for said facial configuration, separating said shell to form said facial configuration into a plurality of component parts, fitting each component part to the appropriate portion of a human face, applying an adhesive to the back of the component parts, and affixing the component parts to the appropriate portion of the human face.

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4,941,213

## FIREFIGHTER'S BOOT AND TROUSER ATTACHMENT

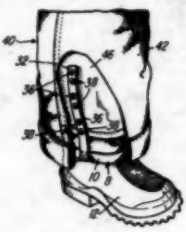
William L. Grilliot, and Mary I. Grilliot, both of 1986 Home Ave., Dayton, Ohio 45417

Continuation of Ser. No. 215,300, Jul. 15, 1988, Pat. No. 4,879,769. This application Sep. 21, 1989, Ser. No. 410,729

The portion of the term of this patent subsequent to Nov. 14, 2006, has been disclaimed.

Int. Cl.[5] A41F *17/04*

U.S. Cl. 2—312 11 Claims



1. Attachment structure for use by a firefighter who wears a pair of firefighter's boots and a pair of firefighter's trousers comprising first connection means, the first connection means being secured to the firefighter's trousers and carried thereby, second connection means, the second connection means being releasably attached to the first connection means, third connection means, the third connection means being in supporting relationship to the second connection means, the third connection means extending from the trousers to the boots and encompassing a portion of the firefighter's boots and attached thereto, whereby the firefighter's trousers are attached to the firefighter's boots.

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4,941,214

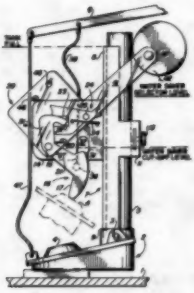
## FLUSH TANK WATER SAVER

John L. Harris, 470 Palm Island, NE., Clearwater, Fla. 34630

Filed Jan. 4, 1989, Ser. No. 293,454

Int. Cl.[5] E03D *1/14*

U.S. Cl. 4—325 17 Claims



1. A water saver control for a toilet flush tank having an outlet, an overflow pipe means, a flapper-float type valve for the outlet mounted on pivots on the overflow pipe means and an externally operated flush lever connected to the flapper valve for opening same on upward movement of said lever, said flapper valve being of the type that holds itself open due to its buoyancy until the tank is empty, the combination of, operator pivot means supported in the tank, a flapper valve operator mounted on said operator pivot means, said pivot means being located above the flapper valve and the operator being arranged to extend downwardly from its pivot means to a contact area with the back of the flapper valve when open to push the valve toward closed position against its buoyancy on rocking of the operator in one direction, the pivot means being located relative to said contact area and flapper valve pivots to cause the areas of contact on the flapper valve and operator to travel in general directions similar enough to avoid substantial rubbing to provide for low friction loss in pushing the valve by the operator, operating means including a float constructed and arranged to rock the operator in said one direction to close the valve in response to falling water to a water saving level, a latch pivot spaced from the pivot means, a latch on said latch pivot having a supporting surface arranged to hold the operator in inactive position allowing the flapper valve to remain open, the operator being biased to close the valve, and means operated by the float on reaching the water saver level in the tank for releasing said latch.

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4,941,215

## AUTOMATIC FLUSHING DEVICE FOR A FLUSH TOILET

Su-Haw Liu, 41-2, Lane 24, Shin Kang Rd., Lin-Ya Dist., Kaosiung, Taiwan

Filed Jan. 19, 1989, Ser. No. 299,037

Int. Cl.[5] E03D *5/10*

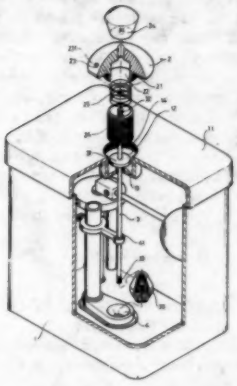
U.S. Cl. 4—406 2 Claims

1. An automatic flushing device for a flush toilet having a tank filled with water, the flush toilet being provided with a valve seat and sealing ball to allow draining of the tank to flush the toilet, said flushing device comprising:

a tank lid for a top of the tank, said tank lid including a recess therein;

a rod which is mounted for vertical movement in the tank, said rod being attached at one end to the sealing ball and extending upwards therefrom and through said recess;

a horizontal disc attached to said rod and located in said recess;
a coil located in said recess about said disc;
a cap which covers said recess;
a coil spring located between said cap and said disc which urges said disc toward the valve seat;
a nut provided on top of said cap which is secured to the other end of said rod; and



a control means, including an infrared sensor located above and adjacent said tank lid, for sensing the use of the toilet by a user and for causing energization of said coil after the user leaves for a predetermined period of time, the energizing of said coil causing said disc to be raised and hence said rod to pull said ball from the valve seat so that the toilet is flushed and such that after the predetermined period of time the coil is deenergized so that said coil spring urges said disc and hence said rod downwardly whereby the ball is returned to the valve seat.

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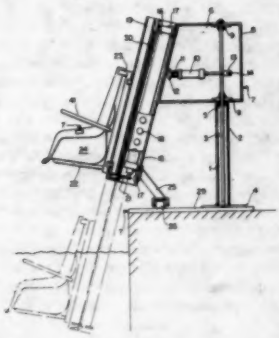
**4,941,216**

## LIFT FOR GIVING ACCESS TO THE WATER IN A SWIMMING BATH OR A RE-EDUCATION POOL

**David Boublil, 9, rue de Brément, F-93130 Noisy-le-Sec, France**

**PCT No. PCT/FR87/00296, § 371 Date Apr. 1, 1988, § 102(e) Date Apr. 1, 1988, PCT Pub. No. WO88/00820, PCT Pub. Date Feb. 11, 1988**
**PCT Filed Jul. 28, 1987, Ser. No. 187,059**
**Claims priority, application France, Aug. 1, 1986, 86 11170**
**Int. Cl.[5] A61G *7/10***
**U.S. Cl. 4—496** **8 Claims**

1. A device for giving access to water to persons with reduced mobility, comprising:
a top plate;
a bottom plate;
a baseplate secured to the ground;
a fixed support post mounted on said baseplate and comprising a steel tube welded to said top plate and a stainless steel tubular shaft centered in said steel tube, said tubular shaft having a bottom end welded to said bottom plate and a top end welded to said top plate;
a rotation block rotatably mounted on said tubular shaft, said rotation block comprising a parallelepipedal frame having front, upper, and lower surfaces, said front surface being sloping and said upper and lower surfaces having a rear and being provided at said rear with completely concentric bearings, said bearings pivoting exactly around said tubular shaft, a bearing plate positioned inside said frame, a rod mounted on and secured to said tubular shaft, pin means and clamping means for securing said rod to said tubular shaft, a horizontal jack having a rear end and a nose, said rear end of said horizontal jack being secured inside said frame on said bearing plate, rear joint means for securing said rear end of said horizontal jack to said bearing plate, and strap means screwed to said nose of said jack and connected to said rod for pivotally mounting said rotation block on said tubular shaft;
a guide plate comprising a fixed upright secured to said front surface of said rotation block, said fixed upright having a top, a bottom, first and second sides, a rear surface, and upper and lower brackets mounted to said top and bottom, respectively;
a moving upright having a top, a bottom, first and second



sides, and a gusset mounted at said bottom, said moving upright sliding in said fixed upright;
slide means for mounting said moving upright to said fixed upright for up-and-down sliding motion;
a vertical jack secured inside said fixed upright by said upper and lower brackets, said vertical jack having a nose and an upper end, said nose being secured to said bottom of said moving upright by said gusset, said vertical jack moving said moving upright with respect to said fixed upright over a distance corresponding to the length of the stroke of said vertical jack; and
a seat secured to said moving upright.

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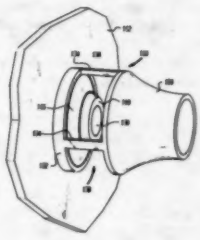
**4,941,217**

## FLOW ENHANCING JET FITTING

**Samuel Tobias, Edison; William E. Treene, Upper Montclair, and George E. Williams, Boonton, all of N.J., assignors to Hayward Industries, Inc., Elizabeth, N.J.**

**Division of Ser. No. 222,209, Jul. 21, 1988. This application Mar. 13, 1989, Ser. No. 322,653**
**Int. Cl.[5] A47K *4/00***
**U.S. Cl. 4—542** **12 Claims**



1. In combination, a hydrotherapeutic receptacle, said hydrotherapeutic receptacle having a wall and a body of water contained therein, and a jet fitting mounted in said wall of said

hydrotherapeutic receptacle, said jet fitting comprising a mixing chamber located within and below said water contained in said hydrotherapeutic receptacle, said mixing chamber being substantially open along its top, bottom and sides; first inlet means for providing communication between said mixing chamber and said water contained in said hydrotherapeutic receptacle, said first inlet means substantially surrounding said mixing chamber so as to permit said water contained in said hydrotherapeutic receptacle to enter said mixing chamber through said top, bottom and sides thereof; second inlet means mounted in said wall of said hydrotherapeutic receptacle at a location below said water contained therein for providing communication between said mixing chamber and a source of pressurized water, said second inlet means including accelerating means for increasing the velocity of water being discharged into said mixing chamber from said second inlet means to thereby create a low pressure condition within said mixing chamber which is sufficient to suck said water contained in said hydrotherapeutic receptacle into said mixing chamber through said first inlet means and said top, bottom and sides of said mixing chamber, whereby said mixing chamber also functions as a suction chamber; discharging means located within and below said water contained in said hydrotherapeutic receptacle for discharging water into said hydrotherapeutic receptacle from said mixing chamber; and mounting means for mounting said discharging means from said second inlet means such that said mixing chamber is positioned therebetween, said mounting means having a flexibility sufficient to permit said discharging means to be deflectable in response to physical contact by a user inside the hydrotherapeutic receptacle.

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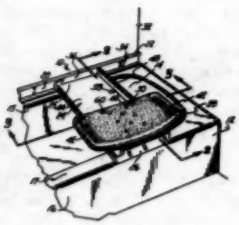
**4,941,218**

## SEAT STRUCTURE FOR EASY ACCESS TO BATHTUBS

**Clyde B. McCartney, Box 64, Big Stone City, S. Dak. 57216**

**Filed Feb. 3, 1989, Ser. No. 305,438**
**Int. Cl.[5] A47K *3/12***
**U.S. Cl. 4—579** **5 Claims**



5. The combination of an elongate bathtub having mutually parallel, spaced-apart, horizontal top surfaces lying in the same horizontal plane and an easy access seat structure; said easy access seat structure including:

a. an elongate, horizontally extending, retainer bracket fixedly mounted in parallel adjacent relation to and above the top surface of a first of said tub top surfaces, said bracket having a platform-retaining portion which extends at least a substantial distance along the first tub to surfaces;

b. a seat platform adapted to have first and second side edge portions capable of resting on and being supported by the top surfaces of both of the tub top surfaces at the same time;

c. a seat pivotally mounted on a fixed vertical axis with respect to the platform to be movable with respect to the platform only through an arc of about ninety degrees between first and second seat positions, the seat when in first seat position being situated to be accessible for sitting by a person outside of the tub adjacent to a second of said tub top surfaces and facing away from the tub, and when in second seat position being situated to support a seated person substantially centered over the tub with that person's feet in the tub;

d. the configuration of the seat and platform being such that the seat is solidly supported with respect to the platform in a horizontal plane during the entire movement of the seat between its first and its second position; and

e. wherein the platform is provided with a boss forming a pair of at least one of the platform side edge portions, the configuration of the platform boss and the bracket being shaped such that the platform boss can be inserted into, and removed from, any convenient position along the platform-retaining portion of the retainer bracket as the platform is moved to angles acute to the horizontal, and the platform-retaining portion of the bracket prevents any motion of the boss and its platform from a direction normal to the bracket and top surfaces of the tub when the boss is in the bracket platform-retaining portion and the platform is in its horizontal position supported by the tub top surfaces, while permitting sliding movement of the platform along the bracket when the platform is not unduly loaded.

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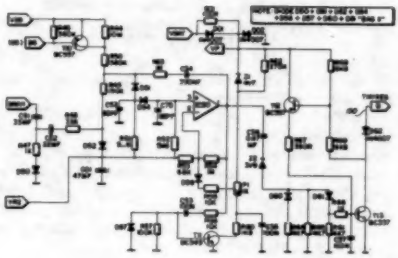
**4,941,219**

## BODY HEAT RESPONSIVE VALVE CONTROL APPARATUS

**Karel C. Van Marcke, Kruishoutem, Belgium, assignor to International Sanitary Ware Manufacturing Cy, S.A., Kruishoutem, Belgium**

**Filed Oct. 10, 1989, Ser. No. 419,315**
**Int. Cl.[5] E03C *1/05, 1/00***
**U.S. Cl. 4—623** **20 Claims**



1. A passive apparatus for controlling the operation of a fluid flow control valve in response to the presence of a human body part, said apparatus comprising in combination:

(a) a sensor for detecting heat irradiating from a human body part within a predetermined detection field and for producing an output signal in response to such detection;

(b) means for amplifying the output signal;

(c) means for opening the valve to permit fluid flow therethrough in response to the amplified signal;
(d) means for closing the valve after a predetermined time period;
(e) a low voltage power source for energizing said apparatus;
(f) means for determining the voltage of said power source while the valve is open;
(g) means for comparing the determined voltage with a predetermined voltage and for generating a control signal if the determined voltage is below the predetermined voltage; and
(h) means for closing the valve in response to generation of the control signal.

15. A passive method for controlling the operation of a fluid flow control valve in response to the presence of a human body part, said method comprising the steps of:
(a) detecting heat irradiating from a human body part placed within a predetermined detection field and producing an output signal in response to said step of detecting;
(b) amplifying the output signal;
(c) opening the valve to permit fluid flow therethrough in response to the amplified signal;
(d) closing the valve after a predetermined time period;
(e) energizing the control and operation of the valve with a low voltage power source;
(f) determining the voltage of the power source while the valve is open;
(g) comparing the voltage determined during said step of determining with a predetermined voltage and generating a control signal if the determined voltage is below the predetermined voltage; and
(h) closing the valve in response to generation of the control signal.

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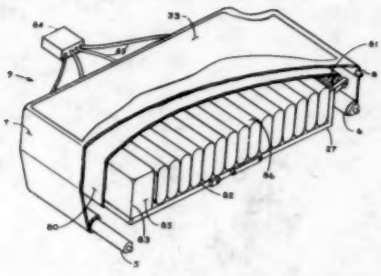
**4,941,220**

## PATIENT CARE AND TRANSFER ARRANGEMENT

**Paul DiMatteo, Dix Hills; Charles F. Chubb, Brookville, and Robert Segnini, Stony Brook, all of N.Y., assignors to Nova Technologies, Inc., Hauppauge, N.Y.**

**Continuation-in-part of Ser. No. 731,533, May 7, 1985, Pat. No. 4,776,047. This application Aug. 15, 1988, Ser. No. 232,030**
**Int. Cl.[5] A61G 7/06**
**U.S. Cl. 5—81 R** **16 Claims**



1. A patient care and transfer arrangement comprising:
a bed having a foot end, a head end and a plurality of inflatable air sacs comprising a mattress on which a patient may lie; a bed frame supporting said mattress; an air pump for inflating said air sacs; pressure adjustment means for regulating the pressures in said air sacs; a wheelchair removably positioned at the foot end of said bed; said wheelchair having wheels, a chair frame, a back rest and a seat; said back rest being removably insertable on said chair frame behind said person; said leg rest being movably connected to said chair frame; said leg rest being movable between a seating position sloping down from said seat and a substantially level transfer position over said seat; said mattress extending to the vicinity of and at substantially the height of the leg rest transfer position; a transport sheet extending across said mattress; roller means for moving said transport sheet and transporting a reclining person across the mattress and partly onto said leg rest; drive means for moving said leg rest from said transfer position to said seating position and thereby moving said reclining person partly onto the seat; lift means for raising said reclining person to a sitting position on the seat; a control system for regulating the operation; a mattress cover sheet extending over said inflatable air sacs and under said transport sheet for supporting said transport sheet; and tensioning means for tightening and slackening said cover sheet.

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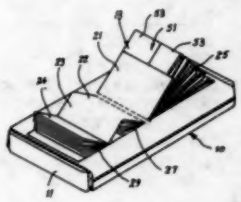
**4,941,221**

## BODY SUPPORTING APPARATUS

**Graham L. B. Kanzler, 18 Ardeana Crescent, Albany, Australia, assignor to Ian Donald Butcher, Mandurah and Graham Leslie Bernard Kanzler, Albany, both of, Australia**

**PCT No. PCT/AU87/00264, § 371 Date Feb. 14, 1989, § 102(e) Date Feb. 14, 1989, PCT Pub. No. WO88/01158, PCT Pub. Date Feb. 25, 1988**
**PCT Filed Aug. 14, 1987, Ser. No. 327,912**
**Claims priority, application Australia, Aug. 15, 1987, PHO7453**
**Int. Cl.[5] A61G 7/06**
**U.S. Cl. 5—60** **14 Claims**



1. A body supporting apparatus comprising a supporting surface defined by a flexible covering having a longitudinal axis, the supporting surface including a central longitudinal section and two marginal longitudinal sections and a longitudinal inflatable chamber positioned beneath each marginal longitudinal section whereby inflation of each longitudinal inflatable chamber causes the respective marginal section to articulate upwardly relative to the central section, the support surface further including a first transverse section extending transversely of the longitudinal axis, said first transverse section being arranged for articulatory movement whereby the supporting surface can assume a first attitude for supporting the body of a person in a generally supine position and a second attitude for supporting the body of a person in a reclining position with said first transverse section supporting the back of the body, and means for effecting articulatory movement of said first transverse section including a first transverse inflatable chamber positioned between said first transverse section and the longitudinal inflatable chambers.

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**4,941,222**

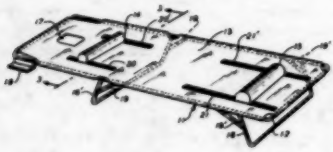
## PORTABLE LOUNGE

**Howard A. Prager, 28 Mandon Dr., Wayne, N.J. 07470**

**Filed Oct. 21, 1987, Ser. No. 111,782**
**Int. Cl.[5] A47C 20/00**
**U.S. Cl. 5—111** **5 Claims**

1. In a portable lounge having a body support portion with an upper surface for supporting a body of a user, and having a frame with generally parallel sides joined to a head portion and

lower portion, said sides having portions being adjustable relative to each other and said sides being provided with legs to maintain the stability of the lounge in various configurations, the improvement which comprises incorporating in the body support portion a first cylindrical supine cervical or neck support and a second cylindrical prone abdominal/lumbar support, each said first and second support being disposed at a right angle to the parallel sides, adjusting means for each support comprising two parallel channel-shaped tracks formed by



strips of fabric affixed to an upper side of the upper support portion surface with each track receiving a T-shaped runner flange affixed to a bottom end of each support with the upper bar of the T being in the channel for allowing these two supports to be moved in a horizontal direction along the surface of the lounge by an exertion of a substantial force on the runners and to retain the position selected without movement and an aperture means near an upper end of the body support portion which is adapted to receive the face of the user and permits a frontal support of the head of the user.

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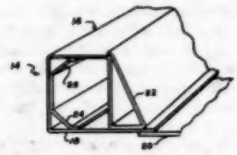
**4,941,223**

**WATERBED MATTRESS MARGINAL PERIMETER AIR SUPPORT AND METHOD OF MANUFACTURE THEREOF**

**Philip J. Santo, 12 Mountain Rd., Rochester, N.Y. 14625**

**Filed Feb. 19, 1988, Ser. No. 158,640**
**Int. Cl.[5] A47C *27/08***
**U.S. Cl. 5—452** **9 Claims**



1. An air perimeter support for supporting the marginal perimeter of a waterbed mattress, said air perimeter support comprising:

a first elongated sheet of flexible, substantially dimensionally stable material folded back on itself and joined together at a location spaced from the longitudinal marginal side edges thereof to form an elongated chamber, of substantially rectangular cross-section, intermediate said longitudinal marginal side edges, one longitudinal marginal side edge being again folded back and joined to said chamber at the wall opposite the wall formed by the material adjacent to the other longitudinal marginal side edge; and

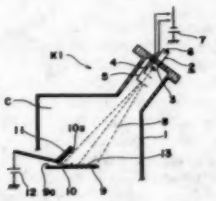
a second sheet of flexible, substantially dimensionally stable material, said second sheet being located in the interior of said elongated chamber and joined to at least three adjacent walls of said chamber starting with the said wall to which said one longitudinal marginal side edge is joined, and going around said chamber opposite to the fold of said one longitudinal marginal side edge.

**4,941,224**

**ELECTROSTATIC DUST COLLECTOR FOR USE IN VACUUM SYSTEM**

**Hiroshi Saeki, Tsukuba; Junji Ikeda, Ikoma, and Hajime Ishimaru, Tsukuba, all of Japan, assignors to Matsushita Electric Industrial Co., Ltd., Osaka and Hajima Ishimaru, Tsukuba, both of, Japan**

**Filed Jul. 19, 1989, Ser. No. 383,150**
**Claims priority, application Japan, Aug. 1, 1988, 63-192535**
**Int. Cl.[5] B08B *6/00***
**U.S. Cl. 15—1.5 R** **2 Claims**



1. An electrostatic dust collector comprising:

a wall enclosing a vacuum chamber in which a target face to be subjected to dust removal is provided;

an electron beam emitting means for emitting electron beams to dust on said target face so as to charge the dust negatively;

a dielectric member which is provided in the vacuum chamber and has a collecting face confronting said target face; and

means for imparting positive potential to said collecting face such that the dust charged negatively is attracted to said collecting face.

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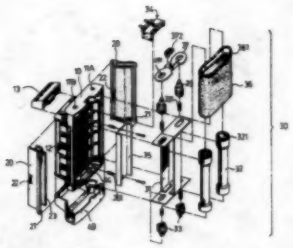
**4,941,225**

**AUTOMATIC CHALK-POWDER COLLECTING DEVICE FOR BLACKBOARD ERASER**

**Su-Land Liao, No.13, Lane 200 Shihtung Load, Shihlin District, Taipei, Taiwan**

**Filed Nov. 13, 1989, Ser. No. 436,009**
**Int. Cl.[5] A47L *13/38*; B43L *21/00***
**U.S. Cl. 15—98** **2 Claims**



1. An automatic chalk-powder collecting device for blackboard eraser mainly comprising a body portion, two symmetrical side covers, a powder-collecting assembly, and a detachable powder box;

said body portion being substantially a hollow case, and the top and bottom of said body portion being provided with two opposite shaft holes for mounting two rollers respectively; and the bottom of said body portion being fur-

nished with several through holes to facilitate chalk powder to fall into a powder box under said body portion;

said two symmetrical side covers being mounted on both sides of said body portion, and each of said side covers being mounted with a wet cotton pad for collecting any chalk powder flying inside said body portion;

said powder-collecting assembly including a fixing frame, a pair of rollers, two pairs of terminal shafts being mounted on both ends of said rollers, a one-way brake switch having two hook detents, and a scraper for scraping chalk powder; and the outside of said rollers being mounted with a rubbing cloth; and both ends of said rollers being mounted with terminal shafts and compression springs respectively; and the top end of said fixing frame being mounted with a horizontal plate, of which the middle part is provided with a pressing plate for pushing downwards said horizontal plate and said terminal shafts so as to have said rollers disassembled easily; and each top end of said rollers being furnished with a ratchet wheel to be engaged with the two hook detents of said one-way brake switch; and said one-way brake switch being coupled with a control handle so as to control said brake switch to move leftwards or rightwards and to let said rollers rotate one way; and when said rollers being engaged with said hook detents, said rollers being unable to rotate, the friction force between a blackboard and said rubbing cloth being increased so as to rub off the chalk powder thereon; and when said rollers rotating in one direction, most of the chalk powder can be scraped off by said scraper.

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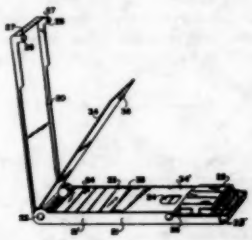
**4,941,226**

## FOLDABLE LOTION APPLICATOR

**Alicia W. Kemper, Tallahassee, Fla., assignor to Innovec, Inc., Tallahassee, Fla.**

**Filed Dec. 5, 1988, Ser. No. 279,979**
**Int. Cl.[5] B05C *17/10***
**U.S. Cl. 15—185** **20 Claims**



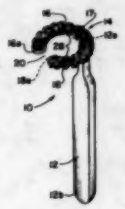
1. An applicator device for applying lotion to the body comprising an elongated structure having a longitudinal axis and having a first and a second elongated section each having opposite end portions, pivot means joining one said end portion of each said section together for movement of said sections between an open outstretched operative position substantially at least doubling said structure along its length and a closed nonoperative position in which said sections fold upon each other to substantially form a closed housing, said first section having an applicator head on its other said end portion, means attached to said head for reasonably carrying a pad of soft absorbent material thereon, and a compartment carried by one of said elongated sections between said sections for the storage of a supply of absorbent pads.

**4,941,227**

## DEVICE FOR CLEANING DENTAL IMPLANT POSTS

**Harold I. Sussman, 64 Popham Rd., Scarsdale, N.Y. 10583**

**Filed Jan. 25, 1989, Ser. No. 302,025**
**Int. Cl.[5] D46B *9/04***
**U.S. Cl. 15—167.1** **20 Claims**



1. A device for cleaning dental implant posts, said cleaning device comprising:

(a) handle means for manually grasping said device; and

(b) brushing means secured to one end of said handle means, said brushing means including:

(i) a first flexible, resilient wire member portion secured to said one end of said handle means and having a convex configuration, said first wire member portion having a first inturned free end;

(ii) a second flexible, resilient wire member portion secured to said one end of said handle means and having a convex configuration, said convex configurations of said first and second wire member portions facing each other, and said second wire member portion having a second inturned free end in opposing and at least partially facing relation to said first inturned free end so as to define a gap between said first and second inturned free ends which is smaller than the distance between proximal and distal sides and an implant post to be cleaned; and

(iii) a plurality of inwardly directed bristles secured to each said wire member portion; and wherein

(c) said first and second wire member portions and said bristles secured to each wire member portion are dimensioned so as to be received between adjacent teeth at least at the gingival area, and said bristles being arranged to brush a dental implant post supporting a tooth at the lingual surface, at the buccal surface and at the gingival margin adjacent the post, said wire portions and said bristles together engaging around a post over an arc greater than 180° and less than 360°; and

said wire member portions are made of spring wire so that when said wire member portions are deflected or spread apart when passing over a post, the wire member portions resiliently return toward their original positions to extend around a major portion of the circumference of said post.

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**4,941,228**

## FASTENING MECHANISM FOR SQUEEGEE HOLDER

**Daniel J. Belanger, and Frank A. Petracek, both of 537 Moorpark #128, Moorpark, Calif. 93021**

**Filed Dec. 9, 1988, Ser. No. 282,027**
**Int. Cl.[5] A47L *13/11***
**U.S. Cl. 15—245** **4 Claims**

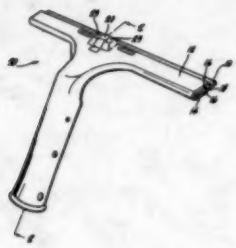
1. A squeegee particularly suited for cleaning window panes and floors comprising:

a. a replaceable cleaning element;

b. a holder adapted to secure a replaceable cleaning element, said holder having a top surface and a bottom surface between which the replaceable cleaning element is removably placed;

c. a fastening means that is pivotally mounted on the top surface, the fastening means being capable of being piv-

oted from a first locking position to a second open position, the fastening means exerting a force upon the replaceable cleaning element when in the first locking position;



d. an aperture on the top surface so that the fastening means can directly contact the cleaning element placed between the top surface and the bottom surface.

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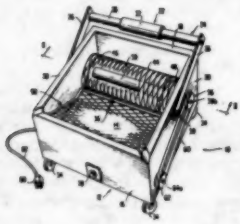
**4,941,229**

**PORTABLE, MOTOR-DRIVEN PAINT ROLLER LOADER**

**Roger La Pierre, 71 Elmwood Ave., Apt. 16, Burlington, Vt. 05401**

**Filed Sep. 11, 1989, Ser. No. 405,164**
**Int. Cl.[5] B44D** *3/12*
**U.S. Cl. 15—257.06** **7 Claims**



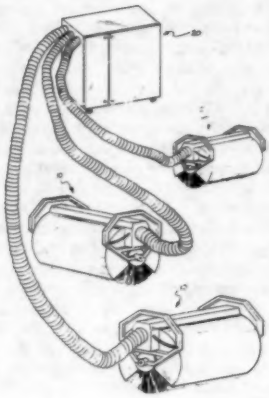
1. A portable, motor-driven paint roller loader comprising:
an upwardly open, rectangular, box-like casing including a horizontal bottom wall, four vertically upright walls integrally joined to the bottom wall about respective edges thereof and forming laterally opposed front and rear walls, and longitudinally opposed end walls sealed at confronting edges, a hollow, perforated cylindrical roller assembly mounted interiorly of the casing for rotation about its axis, and extending horizontally between longitudinally opposed end walls, a drive motor mounted to said casing, means operatively coupling said motor to said hollow perforated cylindrical roller assembly, said hollow perforated cylindrical roller assembly being positioned above the bottom wall whereby, rotation of the hollow perforated cylindrical roller assembly causes, when partially immersed within paint carried by said casing, a thin coating of paint to adhere to the outer periphery of the hollow perforated cylindrical roller assembly during drive motor rotation thereof for ready transfer to a soft, absorbent material cylinder of a paint roller, manually held and parallel to and in peripheral contact with the loader hollow perforated cylindrical roller assembly, above the level of paint accumulated within said casing.

**4,941,230**

**PORTABLE TACKING SYSTEM**

**Patrick H. Lamore, 2577 Belle View Dr., Rochester, Mich. 48064**

**Continuation of Ser. No. 66,972, Jun. 29, 1987, Pat. No. 4,827,561. This application Feb. 6, 1989, Ser. No. 306,563**
**Int. Cl.[5] A47L** *5/36*
**U.S. Cl. 15—314** **16 Claims**



1. A portable tacking unit comprising:
a tacking head including a cylindrical brush, a housing adapted to rotatably support the brush such that a major portion of the circumference of the brush is exposed and a minor portion thereof is surrounded by the housing, said housing further including an exhaust port disposed proximate the minor portion of the brush and adapted to withdraw ambient air therefrom, said tacking head being relatively lightweight and of a size configured for hand-held operation by a single worker;
a central suction unit adapted to provide a flow of air at pressures less than atmospheric; and
a flexible conduit operatively connecting said exhaust port to the suction unit such that a low pressure flow of air is established from said exhaust port to said central suction unit.

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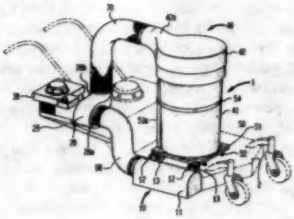
**4,941,231**

**LAWN MOWER ATTACHMENT**

**Robert D. Jarosak, 61 Birch Brook, Smithtown, N.Y. 11787**

**Filed Jul. 31, 1989, Ser. No. 386,721**
**Int. Cl.[5] A47L** *9/10*
**U.S. Cl. 15—328** **8 Claims**



1. A debris collection device for attachment to a lawn

mower providing means to collect spent debris, comprising in combination

a debris chute removably attachable to said lawn mower having one side thereof disposed adjacently to the debris outlet of said lawn mower;

a mechanical blower;

driving means for said blower;

a debris collector;

debris collector support means disposed upon the upper surface of the deck of said lawn mower providing means for bearing support of said debris collector;

a first section of flexible tubing which provides means for communication of said debris chute and said blower; and

a second section of flexible tubing which provides means for communication of said blower and said debris collector.

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**4,941,232**

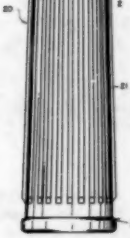
**SLIP RESISTANT, CUSHIONING COVER FOR HANDLES**

**Richard B. Decker, Vermilion, and Joseph Hummel, Amherst, both of Ohio, assignors to Bettcher Industries, Inc., Birmingham, Ohio**

**Filed Oct. 7, 1987, Ser. No. 106,247**

**Int. Cl.[5] B25G *1/10***

**U.S. Cl. 16—111 R** **5 Claims**



4. A thin elastomeric cover for a handle constructed to be applied by the user and readily removable for cleaning and replacement, said cover characterized in that it comprises a laminated sheet suitable for wrapping about the handle and having a base layer of closed cell foam; an outer layer of open cell foam; pressure sensitive adhesive on one side of the base layer; and a strippable cover sheet on the adhesive; and further characterized by: a non-slip surface to facilitate hand gripping under moist or oleaginous conditions;

resilience sufficient to provide cushioning against mechanical shock being transmitted from the handle to the hand during use;

reversible adherence to the handle to provide for non-twisting of the cover during use of the handle and further to provide for removal or replacement of the cover after use;

elasticity sufficient to provide for dimensional modification of the cover so that it contacts substantially the entire surface of the handle over which it lies;

non-permeability to prevent fluid substances from passing through the cover to the handle; and

low thermal conductivity to provide insulation against heat being conducted away from the hand to the handle during use; and further characterized in that the base layer is of non-absorbent cross-linked polyethylene closed cell foam having a density of about 2 pounds per cubic foot, has a compressive strength of 12–16 pounds per square inch at a deflection of about 50%, a tear resistance of 7–12 pounds per inch, and a water absorption of about 0.04 pounds per square foot of cut surface, said base layer being about 1/16 inch thick; and the outer layer is of washable polyether random and open cell foam bonded to one side of the base layer, said polyether foam having a density of about 1.2 pounds, and compressive strength of about 22–27 pounds per square inch at about 25% deflection, said outer layer being about 5½ to 6 cells thick.

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**4,941,233**

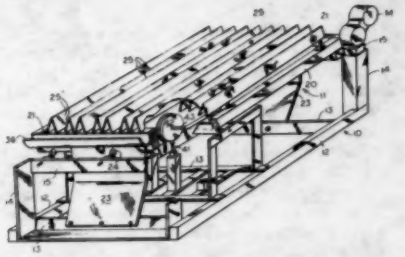
**METHOD AND APPARATUS FOR PROCESSING SHRIMP**

**Reid P. Allain, Marietta, Ga., assignor to Robert B. Kennedy, Atlanta, Ga.**

**Filed Dec. 22, 1988, Ser. No. 288,425**

**Int. Cl.[5] A22C *29/00***

**U.S. Cl. 17—71** **27 Claims**



1. Apparatus for conveying shrimp in single file formation for processing and which comprising elongated support means for slidably supporting shrimp in generally upright orientations with the shrimp heads slidably supported above the shrimp tails and which comprises a pair of rails rigidly mounted together side by side spaced apart a distance to support shrimp generally uprightly in an elongated gap therebetween, means for revolving at least a portion of said elongated support means in a generally vertical plane, and means for deheading shrimp at a deheading station located along said rails that comprises a pinch block rigidly mounted between said rails and a pinch finger mounted for rotary movement along a path of travel that passes closely adjacent to said pinch block about an axis located to one side of said pinch block.

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**4,941,234**

**BUTTON COLLET**

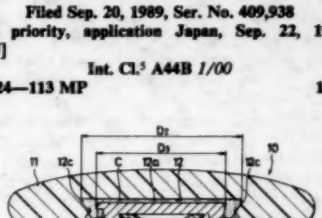
**Hirokazu Watanabe, Kurobe, and Yoshihiro Kanzaka, Toyama, both of Japan, assignors to Yoshida Kogyo K. K., Tokyo, Japan**

**Filed Sep. 20, 1989, Ser. No. 409,938**

**Claims priority, application Japan, Sep. 22, 1988, 63-124122[U]**

**Int. Cl.[5] A44B *1/00***

**U.S. Cl. 24—113 MP** **12 Claims**

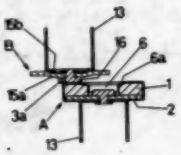


1. A button collet which comprises a cap having a cavity concentric therewith, an insert member adhesively bonded by an adhesive compound in place in said cavity and having a plurality of clamping lugs extending radially inward from its lower peripheral edge and a shank member having a peripheral flange fixedly secured to said clamping lugs, said insert member including a plurality of peripheral notches alternating with said clamping lugs.

## 4,941,235
## MAGNETIC LOCK CLOSURE DEVICE

Yoshihiro Aoki, Tokyo, Japan, assignor to Application Art Laboratories Co., Ltd., Tokyo, Japan

Filed May 2, 1989, Ser. No. 346,158
Claims priority, application Japan, Oct. 14, 1988, 63-258913
Int. Cl.[5] E05C *17/56*
U.S. Cl. 24—303 1 Claim



1. A magnetic lock closure device which comprises:

a magnetically attracting first part and a magnetically attracted second part,

said first part including an annular permanent magnet having opposite poles on opposite sides thereof and a center bore therethrough between said opposite sides, a first ferromagnetic member in the shape of a disk plate attached to one side of said permanent magnet and a nonmagnetic outer cover having a center opening and enclosing said permanent magnet and said first ferromagnetic member with said center opening aligned with said center bore of said permanent magnet,

said second part including a second ferromagnetic member in the shape of a disk plate and adapted to be removably engaged with said outer cover where said outer cover extends over the other side of said permanent magnet,

said first and second ferromagnetic members having respective ferromagnetic rods at the center thereof and extending therefrom toward each other through the center bore and meeting each other when said first and second parts are coupled together,

said permanent magnet having a funnel-shaped portion having an opening extending from said center bore and diverging outwardly to said other side of said permanent magnet, the remainder of said other side being a peripheral flat portion extending radially outwardly from the outer periphery of said outwrdly diverging opening to the peripheral edge of said magnet, said outer cover conforming to and lying immediately over said funnel-shaped portion and said peripheral flat portion, the end of said ferromagnetic rod on said second ferromagnetic member having a size and shape for, when it engages said outer cover over said peripheral flat portion when said parts are being brought into engagement, being attracted to said peripheral flat portion, and when it is moved relative to said outer cover over said peripheral flat portion, being attracted toward said center opening and downwardly along said outer cover over said funnel-shaped portion to bring said ferromagnetic rod on said second ferromagnetic member into said center bore and into contact with said ferromagnetic rod on said first ferromagnetic member and with said second ferromagnetic member against said peripheral flat portion.

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## 4,941,236
## MAGNETIC CLASP FOR WRISTWATCH STRAP

Norman Sherman, Woodbury, and Victor Shiff, Waterbury, both of Conn., assignors to Timex Corporation, Waterbury, Conn.

Filed Jul. 6, 1989, Ser. No. 375,990
Int. Cl.[5] A44B *21/00*; A44C *5/18*
U.S. Cl. 24—303 10 Claims

1. An improved strap and clasp assembly comprising a strap having a pair of separable flexible strap ends adapted to curve around the wrist of a wearer and to overlap one another to provide an overlapped section, at least one of said strap ends including at least one ply of flexible thermoplastic material having embedded particles of permanently magnetizable material, said particles being magnetized to provide a first plurality of rows of alternating magnetic poles, the other of said strap ends including embedded particles of magnetizable material, said strap ends having surfaces contacting one another within

said overlapped section, said contacting surfaces defining mutually nesting, uniformly spaced, protuberances and indentations, whereby said magnetized particles provide a holding force resisting separation of the strap ends, while said nesting protuberances and identations prevent sliding movement between strap ends.

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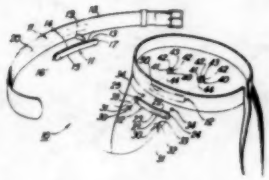
## 4,941,237
## CLOTHING SECURING DEVICE

William K. Hovis, 1295 Dresden Dr., NE., Atlanta, Ga. 30319

Filed Feb. 28, 1989, Ser. No. 316,514
Int. Cl.[5] A44B *21/00*
U.S. Cl. 24—304 3 Claims



1. A fastening device assembly comprising:

(a) a belt and a garment for covering the lower portion of a human body which are normally arranged in an overlapping relationship and which, with movement of the wearer's body, will be moved with respect to each other;

(b) a first fastening member including a flexible first substrate having opposed surfaces, adhesive, disposed along one surface of said first substrate for adhering said first substrate to a surface of [one of] either said belt or said garment [portions of said wearing apparel], and a first clinging element secured to the other surface of said first substrate;

(c) a second fastening member including a second flexible substrate having opposite surfaces and a second clinging element secured to one surface of said second substrate;

(d) mounting means connecting said second substrate to the other of said [portions of wearing apparel] belt or said garment in a position to be adjacent to said first fastening member when said [portions] said belt and garment are in their overlapping relationship and said first clinging means and said second clinging means are in their overlapping relationship and said first clinging means and said second clinging means are in interlocking relationship; said first clinging means and said second clinging means being sufficiently yieldable that when said belt and said garment [portions of wearing apparel] are withdrawn from each other said first fastening member and said second fastening member will be released from each other, and wherein said mounting means includes a pair of spaced pins protruding from said second substrate and passing through said other of said belt or garment; and cap means removably received on end portions of said pins for arresting outward movement of said pins back through the other of said belt or garment.

4,941,238

## SLIDE FASTENERS AND THE LIKE

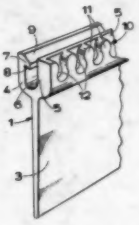
David F. Clark, Broseley, England, assignor to Allison E. Anderson, Great Britain

Filed Feb. 11, 1988, Ser. No. 154,988

Claims priority, application United Kingdom, Feb. 13, 1987, 8703439

Int. Cl.[5] A44B *19/32*

U.S. Cl. 24—437 5 Claims



1. A fastener comprising a first component and a second component which can be releasably engaged with the first component, the first component comprising a first longitudinally extensive engagement formation made of a flexible and resilient material and a first substantially planar, longitudinally extensive attachment portion extending from said first engagement formation, said first engagement formation comprising a pair of mutually spaced body portions extending away from said first attachment portion in a direction parallel with said first attachment portion and defining between inner faces thereof a groove with a longitudinally extensive mouth spaced away from said first attachment portion, first abutment means presenting first abutment face means transverse to said first attachment portion and facing in a direction towards rather than away from said first attachment portion, and a plurality of first longitudinally spaced mating formations, and the second component comprising a second longitudinally extensive engagement formation made of flexible and resilient material and a second substantially planar, longitudinally extensive attachment portion extending from said second engagement formation, said second engagement formation comprising a longitudinally extensive rib extending away from said second attachment portion in a direction parallel with said second attachment portion and of a size to fit into said groove, second abutment means presenting second abutment face means transverse to said second attachment portion and facing in a direction towards rather than away from said second attachment portion, and a plurality of second longitudinally spaced mating formations, each of said first and second components being of the same shape and form as the other and the arrangement being such that the components can be engaged by relative movement towards each other in a direction parallel with the first and second attachment portions and with temporary flexure of the engagement formations so that the rib enters the groove, the first and second abutment faces of the first and second abutment means abut one another to resist separation of the components and the first and second mating formations engage one another to preclude relative longitudinal movement between the components.

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4,941,239

## METHOD TO REDUCE FORMING FABRIC EDGE CURL

Thomas A. Fliss, Montgomery, Ala., assignor to Albany International Corporation, Menands, N.Y.

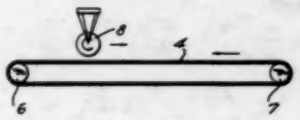
Filed Feb. 14, 1987, Ser. No. 310,738

Int. Cl.[5] D21G *9/00*

U.S. Cl. 26—28 16 Claims

1. A method for reducing forming fabric edge curl comprising:

maintaining a forming fabric in a substantially flat condition, said forming fabric woven from machine direction and cross-machine direction yarns in a pattern producing a surface on said fabric formed substantially by said cross-machine direction yarns, said surface being a long-shute knuckle side of said fabric; and



removing mass from the long-shute knuckle side of the substantially flat forming fabric so that the ratio of the shrink forces acting on the two sides of the forming fabric will be reduced, said mass being removed from said long-shute knuckle side in a band inwardly from an edge of said forming fabric for the length of said forming fabric.

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4,941,240

## BEAM WARPING MACHINE WITH A DEVICE FOR THE MAINTENANCE OF REQUIRED YARN TENSION

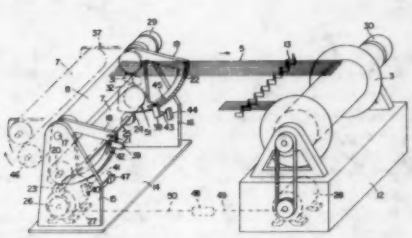
Karl Denzler, Naila; Alfred Böhm, Naila-Hölle, and Alfred Wirth, Schwarzenbach/Wald, all of Fed. Rep. of Germany, assignors to Liba Maschinenfabrik GmbH, Naila, Fed. Rep. of Germany

Filed Apr. 22, 1987, Ser. No. 44,250

Claims priority, application Fed. Rep. of Germany, Aug. 21, 1985, 3529932

Int. Cl.[5] D02H *13/04, 13/26;* B65H *63/036*

U.S. Cl. 28—187 10 Claims

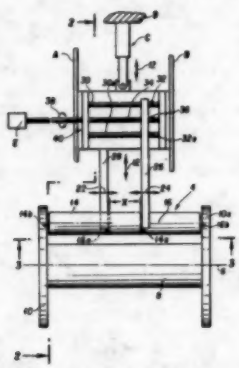


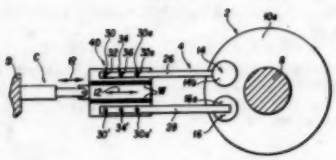
1. In a beam warping machine having a device for the maintenance of required yarn tension in a group of yarns being wound onto a beam which includes a plurality of rolls about which the group of yarns passes in a tortuous path and with said rolls being driven without slippage in an operative position, and having means to move one of said rolls out of the operative position upon actuation of brake means for stoppage of the machine to a location where yarns in said yarn group may pass across said rolls with slippage, the improvement comprising adjustment means associated with said one movable roll for determining the amount of movement of said roll from its operative position so that when said brake means is actuated, said one roll is moved away from its operative position to a location where a straighter yarn path is presented through said tension device and a predetermined amount of slippage exists between said yarns and said rolls while maintaining contact with said yarn.

## 4,941,241
## WARP MACHINE

Hans Affipper, Wuppertal, Fed. Rep. of Germany, assignor to Hans Affipper Textilmaschinenbau GmbH, Fed. Rep. of Germany

Filed Oct. 7, 1988, Ser. No. 255,025
Claims priority, application Fed. Rep. of Germany, Oct. 7, 1987, 3733918
Int. Cl.[5] D02H *13/00, 3/00*
U.S. Cl. 28—196 20 Claims





1. A warp machine for warping and spooling warp threads, particularly elastic warp threads, comprising:

(a) a sled having a linear movement axis;

(b) a warp beam including:

(i) a spool element rotatable about an axis; and

(ii) first and second lateral, flange-like warp beam end discs; and

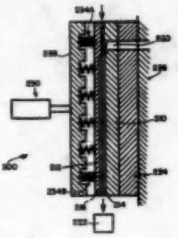
(c) means disposed between said first and second warp beam end discs for compressing warp threads against said spool element, said means for compressing comprising first and second rotatable compression rollers, each compression roller having a rotary mounting end, a free end, a respective axis, and an axial length dimension, said compression rollers axially overlap each other at a central area of the warp beam by an axial length x, wherein x is equal to or greater than zero, and at least one of said compression rollers is adjustable in an axial direction independent of said other compression roller; and

(d) first and second elongated support arms, each joining a respective one of said compression rollers to said sled, each of said support arms having a first end rotatably affixed to a respective compression roller at the mounting end thereof and a second end guided on the sled whereby at least one of the support arms is movable independent of the other in a direction that is perpendicular to their longitudinal extension, wherein the sled is linearly movable in the direction lying essentially radial to the warp beam.

## 4,941,242
## THREAD TREATING NOZZLES

Werner Nabulon, Schneehalde 116, 8455 Rudlingen, Switzerland, assignor to Rieter Machine Works, Ltd., Winterthur, Switzerland

Continuation of Ser. No. 904,360, Sep. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 677,591, Dec. 3, 1984, abandoned. This application Feb. 2, 1989, Ser. No. 306,250
Int. Cl.[5] D02G *1/16, 1/12*
U.S. Cl. 28—255 22 Claims



9. The thread-treating nozzle as defined in claim 8, further including:

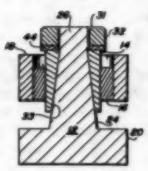
a housing for housing said first nozzle part and said second nozzle part; and

said housing comprising a material having good thermal conductive properties relative to those of said corrosion-resistant metal.

## 4,941,243
## METHOD FOR ASSEMBLING AN ANNULAR SHEAR ACCELEROMETER

Lester G. Cleveland, San Juan Capistrano, Calif., assignor to Allied-Signal Inc., Morris Township, N.J.

Filed Jul. 28, 1989, Ser. No. 387,330
Int. Cl.[5] H01L *41/22*
U.S. Cl. 29—25.35 5 Claims



1. In the assembly of an annular shear accelerometer, a method comprising the steps of:

nesting at least an axially extending portion of an annular crystal in an annular mass element so that a radially outer surface of the crystal abuts a radially inner surface of the mass element;

nesting at least an axially extending portion of a radially expandable force ring in the crystal so that a radially outer surface of the ring abuts a radially inner surface of the crystal;

nesting at least an axially extending portion of a generally conical mounting post in the force ring so that a radially outer, generally conical surface of the post abuts a radially inner surface of the force ring: and

exerting force that tends to produce relative motion between the radially inner surface of the force ring and the radially outer surface of the post in a direction such that the ring

is urged toward a lower base of the post, in response whereby the ring is urged to expand in radially outward directions, thereby radially compressing the crystal between the ring and the mass element.

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**4,941,244**

**METHOD OF PRODUCING DISCARDING SABOT PROJECTILES**

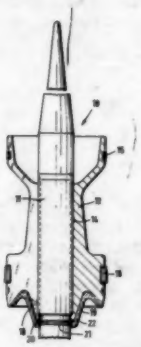
**Helmut Ortmann, Duisburg, and Rolf Scharnhorst, Dusseldorf, both of Fed. Rep. of Germany, assignors to Rheinmetall GmbH, Dusseldorf, Fed. Rep. of Germany**

**Filed Sep. 6, 1988, Ser. No. 240,589**

**Claims priority, application Fed. Rep. of Germany, Sep. 10, 1987, 3730370**

**Int. Cl.[5] B21K *21/06***

**U.S. Cl. 29—1.2** **7 Claims**



1. In a method of producing a discarding propelling cage sabot projectile of a type including a projectile body having a cylindrical portion, means disposed on and extending along a region of an outer surface of said cylindrical portion for providing a form locking connection, and a propelling cage sabot formed of a plurality of adjacent longitudinally extending segments which surround at least said region of said outer surface of said cylindrical portion, which engage said means for providing a form locking connection, and which are fastened in place by holding means, and with said propelling cage sabot having a rear surface which acts as a gas pressure receiving surface during launching of the projectile, and wherein said method includes the steps of fastening the plurality of segments to the projectile body to form the propelling cage sabot which is positioned at an intended rearmost position along the projectile body and held in place by the form locking connection, sealing the gas pressure receiving surface and an interior annulus formed between the sabot and the outer surface of the projectile body at the rear gas pressure receiving surface by spraying a thin coating of rubber, under pressure, onto the rear gas pressure receiving surface of the sabot, and vulcanizing the rubber of said coating; the improvement comprising the following step:

subsequent to said step of fastening and prior to said step of sealing, applying a sealing means to the outer surface of the projectile body adjacent said rear gas pressure receiving surface to seal a rear end of said interior annulus between the sabot and the projectile body.

**4,941,245**

**ROTARY FILE, SUPPORT MEMBER AND ABRASIVE DEVICE**

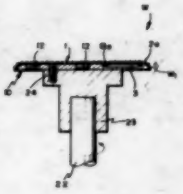
**Teruaki Yamashita, and Hirokazu Naka, both of Iwata, Japan, assignors to Yamaha Hatsudoki Kabushiki Kaisha, Shizuoka, Japan**

**Filed Apr. 19, 1989, Ser. No. 340,516**

**Claims priority, application Japan, Apr. 28, 1988, 63-106763**

**Int. Cl.[5] B23D *67/06, 71/02;* B24D *7/00***

**U.S. Cl. 29—78** **7 Claims**



1. An abrasive rotary disc assembly arranged to be rotated about a central rotational axis and comprising:

a ferromagnetic abrasive disc having an outer surface including cutting elements thereon, said outer surface being centrally planar and having a convexly curved radially outer periphery, said periphery including at least a portion of said cutting elements thereon, and an inner surface extending substantially parallel to said outer surface at least at said periphery, said inner surface including circumferentially spaced, axially projecting disc stop elements disposed between the center of the disc and said curved periphery;

a support member for said disc having an outer surface corresponding geometrically to said inner surface, including a convexly curved radially outer periphery corresponding in shape to said disc inner surface at the disc periphery, said support member including curcumferentially spaced stop engaging means for cooperating with said disc stop elements to prevent relative rotation between said disc and said support member, and magnetic elements arranged to attract said inner surface of said ferromagnetic disc to the outer surface of the support member;

said disc inner surface engaging said support member outer surface in contiguous relationship with said disc inner surface at the disc periphery contiguous with the convexly curved periphery of the support member, with said disc stop elements engaging said support stop means and said magnetic elements solely retaining said disc axially against said support member;

said disc stop elements and said support stop means comprising cooperating radially extending grooves and projections, with at least the radially outer ends of the grooves and projections disposed closer to the disc periphery than the disc center.

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**4,941,246**

**RASPING DEVICE**

**Danny E. Finnegan, 6840 Hickory Ave., Orangevale, Calif. 95662**

**Filed Sep. 19, 1989, Ser. No. 409,084**

**Int. Cl.[5] B23D *71/04, 71/06***

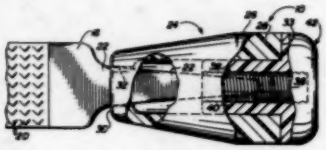
**U.S. Cl. 29—78** **6 Claims**

1. An improved rasping device, said device comprising, in combination:

(a) an elongated blade having a front end and an opposite rear end joined by a middle portion bearing a plurality of rasping protrusions, said rear end bearing a narrow tang

projecting rearwardly thereof along the longitudinal midline thereof; and,

(b) an improved handle, said handle comprising, in combination, a front hollow shell having a closed front end and an open rear end defining a central cavity, said tang projecting through a slit in said closed front end into said cavity and being sealed thereto, a separate, generally cylindrical pinch tube in said cavity and bearing external threading and a transverse slot in the front end thereof into which



the rear end of said tang wedgingly seats in said shell, and a rear cap having a flared rear peripheral portion connected to a forwardly projecting central tubular portion, the latter having a central passageway bearing internal threading, said tubular portion being screwed forward over and in contact with said pinch tube in said cavity to wedge it tightly around said rear end of said tang and cause said flared portion of said cap to abut the rear end of said shell, whereby said handle is held tightly on said blade.

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**4,941,247**

## SEALING ARRANGEMENT FOR A ROLL

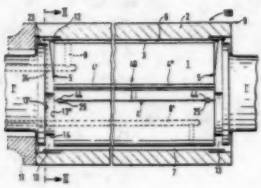
**Klaus Kubik, Krefeld, Fed. Rep. of Germany, assignor to Eduard Küsters Maschinenfabrik GmbH & Co. KG, Krefeld, Fed. Rep. of Germany**

**Filed Apr. 11, 1989, Ser. No. 336,223**

**Claims priority, application Fed. Rep. of Germany, Apr. 22, 1988, 3813596**

**Int. Cl.[5] B21B *13/02, 31/32***

**U.S. Cl. 29—116.2** **14 Claims**



1. A roll and sealing arrangement comprising:

(a) a rotatable hollow roll having a longitudinal axis and an outer working roll circumference;

(b) a stationary crosshead extending through the hollow roll, said crosshead having ends protruding from the hollow roll to which external forces can be applied for supporting the roll;

(c) an annular clearance space formed between an outer circumference of the crosshead and an inner circumference of the hollow roll;

(d) circumferentially spaced longitudinal seals attached to the crosshead, said longitudinal seals abutting the inner circumference of the hollow roll;

(e) axially spaced transverse end seals having a generally semi-annular configuration engaged in respective, circumferential slots formed in the crosshead between axially spaced shoulders and a bottom surface of its respective slot, each transverse end seal being secured in one of said circumferential slots against rotation and being displaceable in a plane perpendicular to the longitudinal axis of the roll;

(f) at least one longitudinal chamber formed in the annular clearance space between the longitudinal seals and the transverse end seals for supporting the hollow roll with pressure liquid contained therein;

(g) a hydraulic relief chamber, in fluid communication with said at least one longitudinal chamber, formed at each of the transverse end seals, each hydraulic relief chamber being bounded by a recess in a side of one of said transverse end seals facing away from said at least one longitudinal chamber and one of the axially spaced shoulders that contacts said side to define a contact region therebetween, said relief chamber extending over substantially the entire contact region; and

(h) a substantially closed pressure chamber, in fluid communication with said at least one longitudinal chamber, formed at each transverse end seal between the bottom surface of one of said circumferential slots and a bottom side of the transverse end seal engaged in said one circumferential slot, whereby said pressure chamber remains substantially closed, even after displacement of the transverse end seal in said one circumferential slot, for exerting a radially outward-directed force on the transverse end seal.

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**4,941,248**

## MECHANISM FOR PROCESSING AND OFFERING TAPEPAKS FOR AUTOMATIC EQUIPPING UNITS

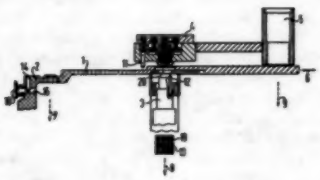
**Werner Seidel, Munich, and Walter Kandler, Percha B Starnberg, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Nov. 10, 1988, Ser. No. 269,427**

**Claims priority, application Fed. Rep. of Germany, Nov. 10, 1987, 3738164**

**Int. Cl.[5] H01R *43/00***

**U.S. Cl. 29—564.6** **7 Claims**



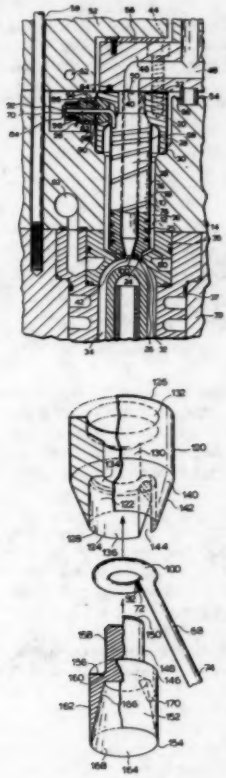
1. A mechanism for processing an operating tapepaks for automatic equipping units, said mechanism comprising a punch and a cut-out tool at a processing position, said cut-out tool being composed of at least one blanking die receiving one bending insert and an ejector, said cut-out tool cooperating with the punch, a slide having a bend-transfer insert and a tapepak holder spaced apart by a given distance, said slide being movable between two initial positions with the first initial position having the tapepak holder being positioned at the processing position and a second initial position with the bend-transfer insert being disposed at said processing position, and means for insuring reproducible positioning of the bend-transfer insert at a transfer position and at the processing position so that the bend-transfer insert is displaceable with the slide between the transfer position and the processing position.

4,941,249

# METHOD OF MAKING AN INJECTION MOLDING NOZZLE HAVING NOSE PORTION WITH HEATING ELEMENT ENCIRCLING THE BORE

Jobst U. Gellert, 7A Prince Street, Georgetown, Ontario, Canada (L7G 2X1)

Division of Ser. No. 260,920, Oct. 21, 1988, Pat. No. 4,911,636.
This application Dec. 5, 1989, Ser. No. 446,183
Claims priority, application Canada, Sep. 30, 1988, 578973
Int. Cl.[5] H05B 3/00
U.S. Cl. 29—611 6 Claims



1. In a method of making an integral elongated heated injection molding nozzle with a forward end, a rear end, and a melt bore extending centrally therethrough from an inlet at the rear end to a gate at the forward end, the nozzle having a central portion with a generally cylindrical outer surface extending from a steel collar portion adjacent the rear end to a nose portion adjacent the forward end, and an electrically insulated heating element with a forward end and a rear end including forming a steel main body portion with a forward end, a rear end and a melt bore extending centrally therethrough, forming the steel collar portion and mounting it on the rear end of the main body portion after winding a portion of the heating element in a spiral channel extending around the cylindrical outer surface of the main body portion with the rear end of the heating element extending outwardly from the collar portion to an electrical terminal, applying brazing material to at least the cylindrical outer surface of the main body portion, and heating the assembly in a vacuum furnace for a period of time and to a temperature sufficient to integrally braze the nozzle together, the improvement including;

(a) providing the forward end of the main body portion with a tapered opening which is in alignment with the melt bore and a diagonal heating element bore, the opening having an inner surface which extends outwardly forward to the forward end of the body portion, the heating element bore extending diagonally from the inner surface to join the spiral channel in the cylindrical outer surface of the main body portion,

(b) forming a steel funnel member having a central bore extending therethrough from a rear end to a forward end, the bore having a larger diameter portion with an inner surface extending from the rear end to join a smaller diameter portion extending from a mouth at the forward end at a radially extending shoulder, the funnel member having a rear portion with an outer surface which tapers outwardly forward from the rear end of the funnel member to match the tapered inner surface of the opening at the forward end of the main body portion, the rear portion having a heating element slot extending diagonally therethrough,

(c) forming a steel hub member with a rear end and a forward end having a smaller diameter head portion which extends centrally from a larger diameter rear portion at a radially extending shoulder, the head portion fitting in the smaller diameter portion of the central bore of the funnel member, the rear portion having an outer surface which fits inside the inner surface of the larger diameter portion of the bore through the funnel member, the rear portion having a central opening thereon with an inner surface which tapers inwardly forward from a mouth at the rear end which is substantially equal in diameter to the melt bore through the main body portion, the rear portion having a heating element slot extending diagonally therethrough,

(d) winding a forward end portion of the heating element to extend around the head portion of the hub member, press fitting the hub member into the funnel member to a position wherein the head portion of the hub member is received in the smaller diameter portion of the bore through the funnel member and the rear portion of the hub member is received in the larger diameter portion of the bore through the funnel member, the forward end portion of the heating element encircles the head portion of the hub member in a circumferential space between the radially extending shoulders of the hub member and the funnel member, and the diagonally extending heating element slots of the hub member and the funnel member are aligned to receive the heating element therethrough, and tack welding the hub member and the funnel member together in this position,

(e) inserting the rear end of the heating element through the diagonal heating element bore in the forward end of the main body portion, seating the assembled hub member and funnel member in the tapered opening in the forward end of the main body portion in a position wherein the tapered outer surface of the funnel member abuts against the matching tapered inner surface of the opening, and the slots of the hub member and the funnel member are aligned with the diagonal heating element bore in the forward end of the main body portion, and tack welding them together in this position,

(f) loading a predetermined amount of brazing material into the mouth of the smaller diameter portion of the bore of the funnel member after winding the portion of the heating element in the spiral channel extending around the cylindrical outer surface of the main body portion with the rear end of the heating element extending outwardly from the collar portion to an electrical terminal and applying the brazing material to the cylindrical outer surface of the main body portion, whereby when the assembly is heated in the vacuum furnace the hub member, funnel member and forward end portion of the heating element are also integrally brazed in place, and

(g) machining through the head portion of the hub member

and machining the funnel member to provide the nozzle with a nose portion of a desired configuration having a gate extending therethrough from the melt bore which is substantially encircled by the integral forward end portion of the heating element.

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**4,941,250**

**ROLLER FOR PRESSURE TREATMENT OF A CONTINUOUS WEB OF MATERIAL**

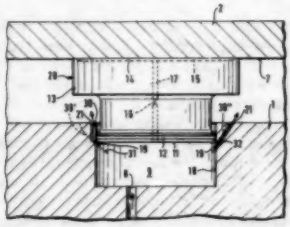
**Karl-Heinz Küsters, Hermann-Schuhmacher Strasse 49, D-4150 Krefeld-Forstwald, Fed. Rep. of Germany**

**Filed Feb. 17, 1989, Ser. No. 312,115**

**Claims priority, application Fed. Rep. of Germany, Feb. 20, 1988, 3805323**

**Int. Cl.[5] B21B *13/02***

**U.S. Cl. 29—116.1** **5 Claims**



1. A roller for the pressure treatment of a continuous web of material comprising:

a cylinder having an outer surface that forms a working roller circumference;

a stationary cross-head extending through the cylinder to form a clearance space therewith between the cross-head and the inner circumference of the cylinder,

a hydraulic support mechanism acting against the inner circumference of the cylinder to support the cylinder on the cross-head, said hydraulic support mechanism including piston-like supporting plungers displaceable in respective cylindrical recesses radially disposed in the cross-head to abut against the inner circumference of the cylinder, said recesses provided with respective supply lines through which pressure fluid is conducted; and

a device limiting the displacement of the cylinder relative to the cross-head including at least one of said supporting plungers and at least one conduit having an inlet connected to one of said cylindrical recesses and an outlet connected to said clearance space outside of the cross-head wherein said inlet is sealed by said at least one supporting plunger until it uncovers the inlet to permit flow through said at least one conduit.

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**4,941,251**

**ROLLERS FOR ROLLING MILLS**

**Masahisa Sobue, Mito; Sensuke Okada; Kimihiko Akahori, both of Katsuta; Keiichi Kuniya, Hitachi; Toshimi Sasaki, Mito; Toshiyuki Kajiwara, Hitachi; Tomoaki Kimura, Hitachi, and Mitsuo Nihei, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Division of Ser. No. 48,907, May 12, 1987, Pat. No. 4,839,949, which is a continuation of Ser. No. 601,358, Apr. 18, 1984, abandoned. This application Jun. 2, 1989, Ser. No. 360,219**

**Claims priority, application Japan, Apr. 22, 1983, 58-69918**

**The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.**

**Int. Cl.[5] B21B *27/00***

**U.S. Cl. 29—132** **35 Claims**

1. A roll for strip sheet rolling mills, the roll being mounted as a work roll in a rolling mill and being a composite roll having an axial length larger than a diameter thereof, said composite roll including a core and a sleeve on said core, said sleeve being a sintered body comprising sialon as a principal constituent and having a density of at least 96% of the sintered body theoretical density.

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**4,941,252**

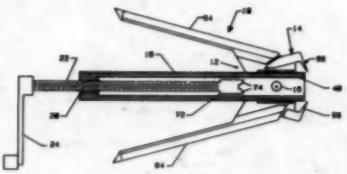
**TOOL FOR EXTRACTING ANCHOR BOLT FROM WALL**

**Bernhard M. Haisch, 519 Cringle Dr., Redwood City, Calif. 94065, and Marilyn E. Bruner, 44 Roosevelt Cir., Palo Alto, Calif. 94306**

**Filed Sep. 1, 1988, Ser. No. 239,474**

**Int. Cl.[5] B23P *19/04***

**U.S. Cl. 29—261** **20 Claims**



1. A tool for removing an anchor bolt from attachment to a wall with the anchor bolt having a flange at one end thereof, an internally threaded sleeve at the opposite end, and an attachment screw threaded into the sleeve and located adjacent to a pair of bendable legs between the flange and the sleeve, the tool comprising:

a support;

means pivotally mounted on the support near one end thereof for coupling the support with the flange of the anchor bolt, said support having means for allowing movement of the attachment screw relative to said coupling means when the support is coupled to said flange; and

means carried by the support and engagable with the attachment screw of the anchor bolt for moving the attachment screw longitudinally of the anchor bolt and relative to the coupling means when the attachment screw is threaded into the sleeve, whereby the legs of the anchor bolt will be caused to become straightened until the transverse dimension of the anchor bolt is sufficient to allow it to be removed from the wall.

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**4,941,253**

**VEHICLE WHEEL-TO-HUB STUD ALIGNMENT AND MOUNTING TOOL**

**Thomas F. Meagher, 9 Lookout Ter., Lynn, Mass. 01902**

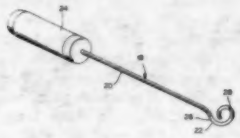
**Filed Nov. 20, 1989, Ser. No. 438,066**

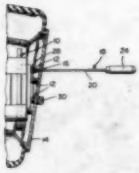
**Int. Cl.[5] B25B *27/14***

**U.S. Cl. 29—273** **9 Claims**

1. A vehicle wheel-to-hub stud and alignment tool including an elongated shank member having a first handle end and a second wheel stud engaging end and an intermediate shank member section extending between said ends, said second wheel stud engaging end including a first portion integral with and forming an extension of the adjacent portion of said inter-

mediate shank member section directed laterally outwardly from the shank member and terminating outwardly in an open convolution free end portion loosely telescopingly engagable





over the free end of a vehicle hub wheel mounting stud, said open convolution free end portion being threadable through a vehicle wheel mounting stud receiving opening.

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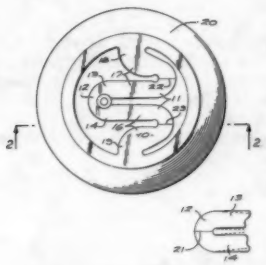
**4,941,254**

**METHOD FOR PRODUCING A MOTION TRANSMITTING AND AMPLIFYING DEVICE**

**Allen V. C. Davis, 21111 Plummer St., Chatsworth, Calif. 91311**

**Division of Ser. No. 284,947, Dec. 14, 1988, Pat. No. 4,891,479.**
**This application Dec. 20, 1989, Ser. No. 443,907**
**Int. Cl.[5] H01H *11/00***
**U.S. Cl. 29—622** **3 Claims**



1. A method of fabricating a motion transmitting and amplifying device including the steps of

fabricating a strip of spring metal configured to resemble the letter W which comprises a pair of driver portions having parallel legs with an output portion loop; one leg of each of said driver portions being connected to a different leg of said output portion,

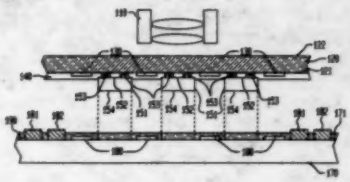
providing means connecting the ends of said driver loops opposite their connections with the output loop for constraining said ends against outward movement with respect to each other; and then stressing the legs of the output portion to tend to reduce the spacing between the output legs as the legs approach the driver portions.

**4,941,255**

**METHOD FOR PRECISION MULTICHIP ASSEMBLY**

**David N. Bull, Brockport, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Nov. 15, 1989, Ser. No. 437,145**
**Int. Cl.[5] H05K *3/30***
**U.S. Cl. 29—833** **17 Claims**



1. A method for positioning an article on a first support member having first indica marks thereon comprising the steps of:

viewing from one surface of a transparent second support member and through the second support member the article which is separated from a second surface of the second support member;

aligning the article with respect to second indica marks on the second support member and coupling the article by a first surface thereof to the second surface of the second support member;

viewing from the one surface of the second support member, which now has the article coupled thereto, the first indica marks on the first support member;

aligning the second support member to the first indica marks and coupling the article by a second surface thereof to the first support member; and

decoupling the second support member from the article.

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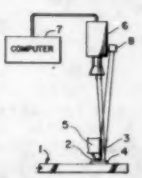
**4,941,256**

**AUTOMATIC VISUAL MEASUREMENT OF SURFACE MOUNT DEVICE PLACEMENT**

**David W. Capson, Hamilton, Canada, and Randy Tsang, Kowloon, Hong Kong, assignors to Canadian Patents & Development Ltd., Ottawa, Canada**

**Filed Jul. 19, 1989, Ser. No. 381,790**
**Claims priority, application Canada, Aug. 19, 1988, 575895**
**Int. Cl.[5] H05K *3/30***
**U.S. Cl. 29—833** **20 Claims**




1. A method of determining the position and orientation of a surface mount component on a printed circuit board comprising:

(a) placing said component on said board at a required location,

(b) illuminating said board with a radiation source so that radiation from the source is reflected by leads of said component and corresponding solder pads on the board to an image sensor,

(c) obtaining an image from the reflected radiation in a single exposure by the image sensor,

(d) processing the image by a computer to provide a processed image with objects in this processed image corresponding to the positions of the leads and pads on the board, and

(e) determining the actual position and orientation of the component's leads with respect to the position and orientation of the pads on the board from the processed image with the computer which then determines if the position of the leads compared to the positions of the pads are within predetermined limits.

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**4,941,257**

## METHOD FOR FIXING AN ELECTRONIC COMPONENT AND ITS CONTACTS TO A SUPPORT

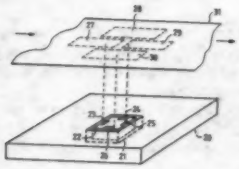
**Jean-Pierre Gloton, Aix en Provence, France, assignor to SGS-Thomson Microelectronics SA, Gentilly, France**

**Filed Dec. 12, 1988, Ser. No. 283,305**

**Claims priority, application France, Dec. 22, 1987, 87 17900**

**Int. Cl.[5] H05K *3/34***

**U.S. Cl. 29—840** **2 Claims**



1. A method to fix an electronic component and its external contacts on a support, said support comprising a cavity to house said component, said method comprising the following operations:

(a) positioning the electronic component (22) in the cavity (21), so that output terminals (23–26) of the component are accessible through the opening of the cavity;

(b) positioning the external electrical contacts (27–30) on a supporting film (31), according to a pattern appropriate to the geometry of the output terminals of the electronic component;

(c) positioning the electrical contacts on the support (20) by means of the supporting film (31);

(d) simultaneously electrically connecting said electrical contacts (27–30) to the output terminals (23–26) of the electronic component (22);

wherein prior to the first positioning step (a), the electronic component is coated with resin which allows the output terminals (23–26) to extend through said protective resin coating whereby the surface of the component is protected.

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**4,941,258**

## METHOD OF ELECTRICALLY INTERCONNECTING DOOR COMPONENTS TO MAIN POWER SUPPLY IN VEHICLE

**James A. Wright, Dearborn Heights, Mich., assignor to United Technologies Automotive, Inc., Dearborn, Mich.**

**Division of Ser. No. 191,089, May 6, 1988, Pat. No. 4,862,011. This application Jul. 6, 1989, Ser. No. 376,099**

**Int. Cl.[5] H01R *43/00***

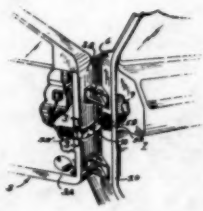
**U.S. Cl. 29—858** **8 Claims**

1. A method of electrically interconnecting several electrical components in a movable, hinged door having a hinge axis on a vehicle body to a main electrical power supply system in the body, in which a door side edge area and a body opening are provided for interconnecting electrical wiring between the door and the body, comprising the following steps:

(a) utilizing a relatively flat and substantially laterally extended, electrical, planar cable, which has included within it a series of juxtaposed, substantially parallel, extended electrical wires in a substantially side-by-side array defining a laterally extended plane, there being of the order of at least about four wires in at least general side-by-side array with less than about four wires in its thickness dimension, in said electrical cable;

(b) extending said relatively flat, planar cable from said door through said door side edge area at least adjacent to said body opening, and using it to at least indirectly electrically interconnect the electrical components in said door into the main power supply system in the vehicle body; and

(c) aligning, extending and positioning said planar cable in its extent from said door adjacent to said body opening with the laterally extended plane of said planar cable at least generally lying in a substantially vertical plane, with the



planar cable being folded back onto itself with a fold-line substantially parallel to the hinge axis of the door when the door is closed, with the plane of said planar cable array being substantially vertically aligned as it travels from the door side edge area over adjacent to the body opening, with a length of said planar cable between said door side edge area and said body opening being substantially equal to a separation distance between said door side edge area and said body opening when the door is in its maximum, open position, without any additional significant slack in the electrical cable between the door and the body opening when the door is completely open, with said planar cable extending directly across from said door side edge area to said body opening in at least a generally horizontal path.

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**4,941,259**

## DRY SHAVING APPARATUS WITH A SHORT-HAIR CUTTER AND A SLIDABLE LONGHAIR TRIMMER

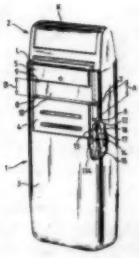
**Jürgen Wolf, Kriftel, Fed. Rep. of Germany, assignor to Braun Aktiengesellschaft, Kronberg, Fed. Rep. of Germany**

**Filed Aug. 17, 1988, Ser. No. 233,339**

**Claims priority, application Fed. Rep. of Germany, Sep. 2, 1987, 3729257**

**Int. Cl.[5] B26B *19/10***

**U.S. Cl. 30—34.1** **21 Claims**



1. A dry shaving apparatus comprising a housing, a short-

hair cutter, a long-hair trimmer, a manually operated first switch slide slidably arranged on said housing for turning the dry shaving apparatus on and off, a second switch slide operatively associated with said first switch slide and carrying said long-hair trimmer which is movable by means of said second switch slide from a position of rest into an operating position lying in the area of said short-hair cutter and which in the operating position is coupled to the drive of the dry shaving apparatus, and first and second gear arrangements, one of said gear arrangements being provided for the travel of said first switch slide and another of said gear arrangements being provided for the travel of said second switch slide, said gear arrangements being interengageable in the course of the travel of said first switch slide.

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**4,941,260**
**UTILITY KNIFE**

**James Castelluzzo, 188 Avenue of the Americas, New York, N.Y. 10013**

**Continuation of Ser. No. 894,676, Aug. 8, 1986, Pat. No. 4,813,132. This application Dec. 15, 1988, Ser. No. 284,991**
**The portion of the term of this patent subsequent to Mar. 21, 2006, has been disclaimed.**
**Int. Cl.[5] B26B *29/02***
**U.S. Cl. 30—162** **24 Claims**

1. A knife comprising

(a) a first body portion, including blade retaining means for retaining a stack of knife blades therein;

(b) a second body portion matable with said first body portion to provide a knife housing including a blade opening, said second body portion including an inner surface having a plurality of locking wells disposed parallel to a predetermined direction within said knife housing; and

(c) a unitary slide member slidably disposed for motion in said predetermined direction within said knife housing, said unitary slide member including blade control means for controlling the removal of a single blade located in a predetermined plane from said stack of blades, blade engagement means for engaging said single blade in a fixed position with respect to said unitary slide member whereby said single blade may be slidably moved within said predetermined plane between at least one operative position projecting through said blade opening and a retracted position within said knife housing, and locking means for locking said unitary slide member in a plurality of fixed positions, including said at least one operative position, said locking means comprising control peg means projecting from said blade engagement means, said blade engagement means being movable between a first blade engaging position in which said control peg means is disposed in one of said plurality of locking wells, and a second blade engaging position in which said control peg means is displaced from said plurality of locking wells, whereby said unitary slide member may be slidably moved to a position in which said control peg means is located at a position corresponding to one of said locking wells, without disengaging said blade engagement means from said blade.

**4,941,261**
**KNIFE WITH WRIST BRACE**

**Robert A. Glenn, Rte. 6, Box 33, Cookeville, Tenn. 38501**

**Filed Jun. 17, 1988, Ser. No. 208,135**
**Int. Cl.[5] B26B *3/00***
**U.S. Cl. 30—296.1** **6 Claims**

1. A knife having a handle and blade oriented in axial alignment with the handle adapted to be gripped by a user, a wrist brace for connection with the handle and extending above the wrist joint and forearm of the user of the knife, said wrist brace including an elongated substantially rigid brace member disposed above the wrist joint and forearm and including a laterally extending end portion rigidly connected with the knife handle, the other end of the elongated brace member including a laterally extending saddle engaged with but not rigidly associated with the forearm of the user to reinforce and brace the wrist joint to maintain the wrist joint in underlying relation with the elongated brace member during use of the knife and resisting deflection of the wrist joint when applying vertical pressure on the knife handle, said saddle being an inverted, downwardly opening semi-cylindrical member having curved side edges engaging the upper surface of the forearm, said saddle being connected to the end of the elongated brace member remote from the knife handle by a bracket structure that spaces the saddle laterally from the elongated brace member, said elongated brace member being substantially straight, said bracket being pivotally connected to the end of the brace member remote from the knife handle by a transverse fastening structure to enable pivotal movement of the saddle about an axis transverse to the longitudinal axis of the elongated brace member and transverse to the forearm.

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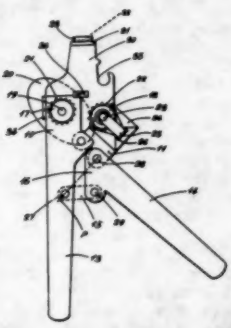
**4,941,262**
**CAN OPENER**

**Tony Y. M. Law, Kowloon, Hong Kong, assignor to Emmarco Industries Co., Ltd., Kowloon, Hong Kong**

**Filed Oct. 30, 1989, Ser. No. 428,615**
**Int. Cl.[5] B26B *17/02***
**U.S. Cl. 30—419** **6 Claims**



1. A can opener comprising first and second support members, a rotatable drive wheel on one of the support members for advancing the opener around a can, a cutting blade on the other support member, the first and second support members

being pivotable relative to one another between a closed configuration in which the cutting blade co-operates with the drive wheel to cut the can and an open configuration in which the cutting blade and drive wheel are separated to facilitate attachment of the opener to and detachment of the opener from the can, a first toggle link pivotably connected to the first support member about a first pivot axis, a second toggle link pivotably connected to the second support member about a second pivot axis and to the first toggle link about a third pivot axis, a first handle secured to or integral with the first support member and a second handle secured to or integral with one of the toggle links, the arrangement being such that movement of the second handle towards the first handle will move the support members to said closed configuration and movement of the second handle away from the first handle will move the support members to said open configuration and being such that when the support members are in said closed configuration and a force is applied between the cutting blade and the drive wheel in a sense to move the blade and wheel apart the support members will remain in said closed configuration.

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**4,941,263**

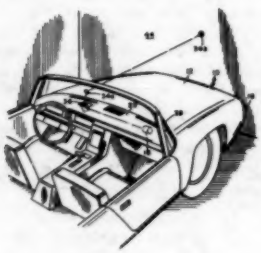
## SYSTEM FOR AIDING A DRIVER'S DEPTH PERCEPTION

**Gerald P. Hirshberg, Del Mar, Calif., assignor to Nissan Design International, Inc., San Diego, Calif.**

**Continuation of Ser. No. 715,343, Mar. 25, 1985, abandoned. This application Sep. 29, 1986, Ser. No. 912,532**

**Int. Cl.[5] G01B** *11/14*

**U.S. Cl. 33—264** **2 Claims**



1. A system for aiding a driver of a vehicle in positioning the vehicle so that its front bumper will be closely adjacent to a wall or other stationary object in front of the vehicle, comprising:

a transparent windshield having a predetermined curvature mounted in the vehicle to permit a forward field of view of a driver seated in an interior of the vehicle on a driver's side thereof;

a dashboard extending across a width of the interior of the vehicle adjacent the windshield, the dashboard having an upwardly facing opening on the driver's side of the interior which communicates with an unobstructed focal path which extends beneath the dashboard from the driver's side of the interior to a passenger side of the interior;

means mounted beneath the dashboard on the passenger side of the interior at a first end of the focal path for generating an illuminated colored target of fixed dimensions, including a fixed reticile, a lamp mounted behind the reticile, and a source of electric power connectable to the lamp;

a fixed mirror mounted beneath the dashboard on the driver's side of the interior at a second end of the focal path a fixed distance F1 from the means for generating the target for reflecting light therefrom upwardly through the opening in the dashboard onto an interior surface of the windshield to thereby create a readily discernible virtual image of the colored target which appears to the driver to emanate from a location a fixed distance F2 from the driver's eyes, the location of the virtual image being above and slightly forward of the front bumper; and

the distance F1 between the means for generating the target and the mirror being selected relative to the distance F2 between the virtual image of the colored target and the driver's eyes to compensate for the curvature of the windshield and so that the driver may gradually advance the vehicle until the virtual image of the colored target appears to be juxtaposed with the object at which time a fixed distance F3 between the object and the front bumper will be approximately eight inches or less.

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**4,941,264**

## DEVICE FOR READING DIRECTLY FROM A CHART THE HEADING TO BE FOLLOWED BY AN AIR OR SEA-GOING VEHICLE

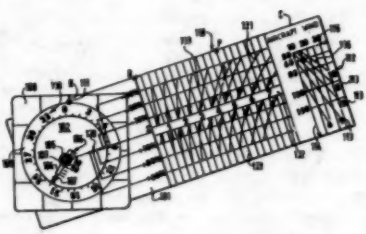
**Alain Poirier, 16, boulevard Flandrin, 75116 Paris, France**

**Filed Feb. 28, 1989, Ser. No. 316,840**

**Claims priority, application France, Mar. 1, 1988, 88 02527**

**Int. Cl.[5] G01C** *21/20*; **B43L** *7/06*

**U.S. Cl. 33—457** **12 Claims**



1. A device for directly reading from a chart the heading to be followed by an air or sea-going vehicle, comprising a disk having at its periphery a rotatable circular coaxial graduation of the "compass card" type rotatable with respect to the disk so as to be able to be oriented with respect to the North, this disk being itself mounted for rotation about a fixed shaft integral with a support, through a rotary fitting with offset adjustable in modulus as a function of a value representative of the wind or current speed/proper speed of the vehicle ratio and in orientation along the direction of the wind or of the current, said disk further comprising at least one scale for determining the modulus of the offset, as well as a first reference mark for indicating the orientation of this offset on the circular graduation, said scale being graduated in successive values representative of said wind or current speed/proper speed of the vehicle ratio, the heading to be followed being indicated on the circular graduation by a straight line oriented along the geographical heading or course and passing through said axis, wherein said support comprises a rectilinear edge adapted for alignment with a geographical heading plotted on the chart, an axis (VS) parallel to said edge and passing through said fixed shaft, and means for reading the flight or navigation time as a function of a distance between two points on the chart, the proper speed of the vehicle, the scale of the chart and a correction ratio of the flight or navigation time, said axis forming with an edge of said disk an intersection point having a position which determines said correction ratio.

**4,941,265**

## APPARATUS FOR PREVENTING CHANGES OF THE POSITIONS OF MACHINES

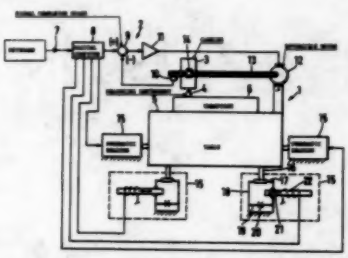
**Klaus-Peter Heiland, Raunheim, Fed. Rep. of Germany, assignor to Barry Controls GmbH, Raunheim, Fed. Rep. of Germany**

**Filed Jul. 13, 1988, Ser. No. 218,650**

**Claims priority, application Fed. Rep. of Germany, Jul. 16, 1987, 3723466**

**Int. Cl.[5] G01B** *5/03, 21/00*

**U.S. Cl. 33—504** **9 Claims**



1. Apparatus for preventing changes of the position of a machine wherein a first part supports a mobile second part and the first part is subject to the action of variable forces tending to change the position of the first part in response to movement of the second part, the movement of said second part including a plurality of stages, comprising adjustable bearings for the first part, said bearings being arranged to offer a variable resistance to changes of the position of the first part; and means for adjusting said bearings so as to vary said resistance in time to enable the bearings to counteract and neutralize said variable forces during each stage of movement of the mobile part relative to the first part of the machine, said adjusting means including a memory for storing signals denoting the desired position of the mobile part relative to the first part during each of said stages, and means for transmitting from said memory to said bearings adjustment signals in dependency on signals in said memory, said adjustment signals pertaining to various stages of movement of the mobile part before the mobile part reaches the respective stages so as to enable said bearings to offer appropriate resistance to changes in the position of the first part when the mobile part reaches the respective stages of its movement relative to the first part.

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**4,941,266**

## FEELER DEVICE FOR FORMING A MEASUREMENT VALUE WHEN SENSING A WORKPIECE

**Marcel Bissegger, Safnern, and Alain Stegmann, Biel, both of Switzerland, assignors to Saphirwerk Industrieprodukte AG, Biel, Switzerland**

**Filed Feb. 23, 1989, Ser. No. 314,098**

**Claims priority, application Switzerland, Mar. 11, 1988, 923/88**

**Int. Cl.[5] G01B** *11/24*

**U.S. Cl. 33—556** **11 Claims**

1. A feeler device for forming a measurement value when sensing a workpiece, said feeler device comprising:

a housing;

means at one end of said housing for securing said housing to an actuating mechanism;

a measuring element mounted inside said housing;

annular mounting means fixed adjacent the opposite end of said housing for supporting a ball element within said housing for swivelling movement relatively thereto;

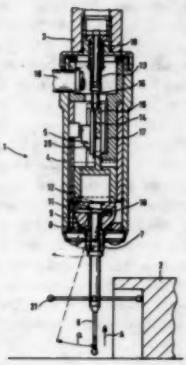
a carrying member axially fixed to said ball element;

at least one feeler pin fixed to said carrying member and projecting outside said housing;

means for yieldingly pressing said ball element against said mounting means;

means for activating said measuring element according to movement of said ball element from a neutral position thereof;

a guide element fixed to and extending along said housing in the vicinity of said ball element; and



a securing element extending out of said ball element to engage said guide element to prevent said feeler pin from turning said ball element at least in said neutral position thereof, said securing element comprising a cylindrical pin whose axis extends at a right angle to an axis of said carrying member through a center point of said ball element.

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**4,941,267**

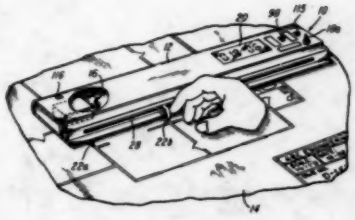
## ELECTRONIC MEASURING DEVICE AND METHOD FOR OBTAINING AN ACTUAL MEASUREMENT BETWEEN POINTS SHOWN ON A SCALED DRAWING

**Ronald J. Miller, Jr., 3461 Swigart Rd., Bellbrook, Ohio 45305**

**Filed Jul. 31, 1989, Ser. No. 387,586**

**Int. Cl.[5] B43L** *5/00*

**U.S. Cl. 33—700** **31 Claims**



1. An electronic measuring device for determining the actual distance in feet and inches between a first point and a second point which are illustrated on a scaled drawing, said electronic measuring device comprising:

a master controller for controlling the electronic measuring device, said master controller including reset signal means capable of generating a reset signal;

calibrating means for adjustably selecting a scale of measurement;

indicia means coupled to said calibrating means for indicating the location of said first and second points on the scaled drawing;

generating means coupled to said calibrating means for

generating a first signal corresponding to the actual measurement of the distance between the first and second points which are illustrated on the scaled drawing and as located on the drawing by the indicia means;

converting means coupled to said generating means for converting said first signal to a second signal;

first binary counter means coupled to said converting means for receiving said second signal and for generating a first binary count in response thereto;

second binary counter means for generating a second binary count;

first logic gate means operatively coupling said first binary counter means and said second binary counter means and said converting means and said master controller, whereby said second binary count is incremented when said first binary count reaches a predetermined count; and

output means coupled to said first and second binary counter means for receiving said first and second binary counts and also for outputting said actual measurement which corresponds to said first and secondary binary counts;

said output means including latch means operatively coupling said master controller and said output means, and said first and second counter means for latching said first and second binary count until said latch means receives said reset signal from said reset signal means of said master controller.

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**4,941,268**

## OIL LEVEL GAUGE

**Edward F. Tausk, Downers Grove, Ill., assignor to Navistar International Transportation Corp., Chicago, Ill.**

**Filed Feb. 2, 1989, Ser. No. 305,586**
**Int. Cl.[5] G01F *23/04***
**U.S. Cl. 33—729** **8 Claims**

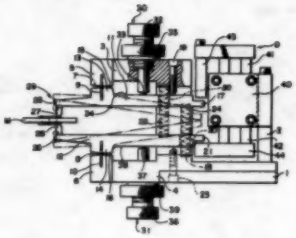
1. An oil level measuring device comprising an ullage rod including a handle attached thereto for controlling said ullage rod, a plurality of axially aligned cylindrical segments having axially aligned openings therethrough including an end segment and a base segment, said segments being unattached to each other, said base segment engaging said handle, a tension cable extending from said handle through said base segment to said end segment through said openings, and a spring for tensioning said cable, said spring and cable being disposed to bias said segments into abutting relationship, at least one of said segments defining an oil reading surface for indicating the oil level.

**4,941,269**

## THICKNESS MEASURING APPARATUS

**Sanae Mori, Nagoya; Takayosi Sasaki, Tajimi, and Takehiro Ozika, Nagoya, all of Japan, assignors to Daido Metal Company, Ltd., Nagoya, Japan**

**Filed Aug. 3, 1989, Ser. No. 389,201**
**Int. Cl.[5] G01B *7/12***
**U.S. Cl. 33—783** **3 Claims**



1. An apparatus for measuring a thickness of an article, comprising pivot means provided on tip ends of upper and lower arms of a generally C-shaped block; lever members pivotally mounted on said pivot means by spring elements; thickness measuring means provided on the outer ends of said lever members and having opposite measuring elements adapted to contact with said article for measurement of the thickness thereof; upper and lower spring members adapted to bias said lever members in a direction, in which said measuring elements come into contact with each other, and to act on said lever members such that a biasing force on said upper lever member is made larger than a biasing force on said lower lever member; thickness measuring devices provided on said arms and adapted to cooperate with said lever members to measure the thickness of said article; and means adapted to engage with the inner ends of said lever members to swing said lever members in a direction, in which said thickness measuring means is opened.

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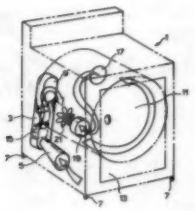
**4,941,270**

## OZONE DRYER

**G. E. Bud Hoffman, Brampton, Canada, assignor to 501 Geonate Holdings Inc., Brampton, Canada**

**Continuation-in-part of Ser. No. 98,924, Sep. 21, 1987, abandoned. This application Feb. 8, 1989, Ser. No. 307,504**
**Int. Cl.[5] F26B *11/04***
**U.S. Cl. 34—60** **3 Claims**



1. A domestic clothes dryer having a rearwardly exposed air intake providing a flow path for air to be circulated interiorly of said dryer, said air intake having an access region fitted with an ozone producing corona grid member positioned in said flow path so that the air is ozone charged prior to being circulated within said dryer, said corona grid member having a modular construction and being removably secured in said air

intake for servicing thereof, said modular construction comprising a frame portion with an electrical grid secured in said frame portion, said electrical grid presenting a fixed position electrical contact extending out of said frame portion, said access region of said air intake comprising a door openable at said air intake, said door being provided with guide means for receiving said frame portion and said air intake including a contact closure positioned to receive said electrical contact of said electrical grid upon closing of said door with said frame portion fitted in said guide means.

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**4,941,271**

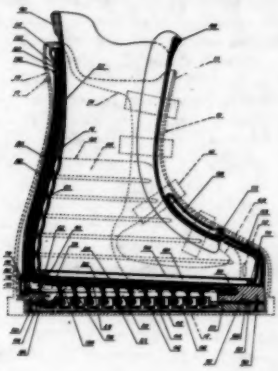
**BOOT WITH FRICTIONAL HEAT GENERATOR AND FORCED AIR CIRCULATION**

**Nikola Lakic, 45-191 Elm St., Indio, Calif. 92201**

**Filed Aug. 11, 1988, Ser. No. 230,908**

**Int. Cl.[5] A43B** *7/02, 5/04;* **A41D** *1/00;* **A61F** *7/00*

**U.S. Cl. 36—2.6** **25 Claims**



1. A boot having an internal, sealed air system with forced air circulation which comprises:

a. a sole formed of an outer sole and an inner sole pivotally attached together at the toe of the boot for hinged movement in response to the movements of a wearer's foot;

b. a first compartment between said outer and inner soles;

c. a flexible diaphragm extending between said inner and outer soles, enclosing and sealing said first compartment;

d. at least a second compartment located within said boot and above the inner sole thereof;

e. an air passageway means open to said first and second compartments and extending therebetween to permit free air flow between said compartments; and

f. a frictional heat generator mounted in said first compartment for movement in response to said hinged movement of said inner and outer soles, thereby providing a frictional heat generator located within said first compartment.

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**4,941,272**

**ORTHOPEDIC FOOTBRACE**

**Don T. Allen, 4406 Oxford Way, Norman, Okla. 73072, assignor to Don T. Allen, Norman, Okla.**

**Filed Jun. 30, 1989, Ser. No. 342,332**

**Int. Cl.[5] A43B** *7/19*

**U.S. Cl. 36—91** **1 Claim**

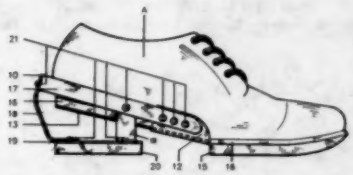
1. A foot brace (10) comprising:

an oxford-type shoe (A) having a sole (16) connected to the bottom thereof and a shoe heel portion,

an arch lift plate (12) connected to the bottom of the sole (16) at the region of the shoe arch,

A steel spring (13) connected between the sole (16) and the arch lift plate (12) to allow the shoe heel portin to flex downwardly,

an arch plate brace (17) connected to the arch lift plate (12) and extending rearwardly therefrom,




a plurality of heel plate braces (18) extending down from the arch plate brace (17) and connected to a heel plate (19) and a heel (20) connected to the heel plate (19) whereby the arch lift plate (12) is connected to the heel (20) which is disconnected from the shoe heel portion and is supported soley by the arch lift plate (12).

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**4,941,273**

**SHOE WITH AN ARTIFICIAL TENDON SYSTEM**

**Theodore S. Gross, Stony Brook, N.Y., assignor to Converse Inc., North Reading, Mass.**

**Filed Nov. 29, 1988, Ser. No. 277,680**

**Int. Cl.[5] A43B** *5/00, 7/32*

**U.S. Cl. 36—114** **4 Claims**

1. A shoe including an artifical tendon system, the system comprising:

a midsole having a longitudinal axis, a heel area and a forefoot area, the midsole further including a passageway therethrough along the longitudinal axis of the midsole;

a band of elastic material, the band having one end thereof anchored proximate to the forefoot area of the midsole and extending through the passageway in the midsole, the band further including a second end; and

retaining means, disposed proximate to the heel area of the midsole, for securing the second end of the band so that the band may be secured under tension when the shoe is secured on the foot of a wearer, whereby extension of the elastic material during heel strike and early propulsion creates tension in the band which tension is released during toe off.

4,941,274

## CROSS COUNTRY SKIING BOOT

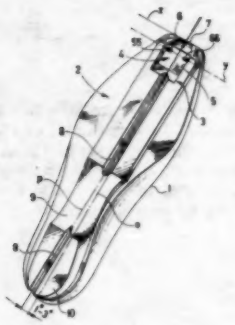
Frantisek Janos; Josef Storek, both of Skutec, and Ladislav Krepelka, Gottwaldov, all of Czechoslovakia, assignors to Obuvnicky prumysl SVIT statni podnik, Gottwaldov, Czechoslovakia

Filed Apr. 14, 1989, Ser. No. 339,056

Claims priority, application Czechoslovakia, Apr. 14, 1988, 2537-88

Int. Cl.[5] A43B 5/04

U.S. Cl. 36—117 11 Claims



1. A ski boot, comprising:

an upper and a sole, the sole having an upper side facing the upper and a bottom side, the sole further having a longitudinal axis associated therewith, a toe region, a heel region, an inside region on one side of the longitudinal axis, and an outside region on the other side of the longitudinal axis;

ski boot binding means for pivotally binding the ski boot to a ski, the ski boot binding means located at the toe region on the sole; and

a substantially straight groove having a center extending along the deepest point in the groove, the groove formed in the bottom side of the sole and extending generally in the direction of the longitudinal axis but at a predetermined angle thereto, the center of the groove lying in the outside region of the sole and intersecting t he longitudinal axis at the toe region of the sole, in a manner which is effective to cause the heels of a skier to point toward one another when standing flat on a pair of parallel oriented standard skis.

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4,941,275

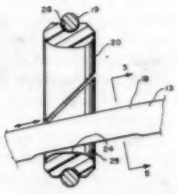
## SNOW GROOMER VEHICLE HYDRAULIC HOSE GUIDE

Michael G. Beeley, Logan; James D. Gittins, Smithfield, and William B. Sinykin, Logan, all of Utah, assignors to Logan Manufacturing Company, Logan, Utah

Filed Oct. 13, 1988, Ser. No. 257,279

Int. Cl.[5] E01H 4/00, 5/04

U.S. Cl. 37—219 3 Claims



1. A device for use upon snow grooming equipment for guiding at least one hydraulic hose said hose having a longitudinal center line and a rubber-like outermost sheath, said device comprising:

a member having a surface disposed for guiding the hose by contact with a side thereof, said surface being smooth, free of geometric discontinuities, and shaped to distribute hose guiding forces over a substantial portion of the outermost sheath, to prevent highly concentrated bearing forces between the member and the sheath, said guiding member being of plastic material of substantially greater hardness than that of the sheath;

said guiding member comprising a toroidal ring with an inside surface having a diameter substantially greater than the outside diameter of the hose, the hose contact surface of said member being said inside surface thereof, said inside surface being curved transversely to the ring at opposed sides thereof so as to form curved surfaces, so as to be free of hose contacting discontinuities; wherein the hose contacting surface comprises an intermediate cylindrical portion tangentially joined with said curved surfaces at each side of the ring; the guiding member further comprising an external steel ring into which the toroidal ring is inserted and secured, said toroidal ring having an external outwardly facing circumferential groove thereabout for accepting said steel ring aid steel ring having means for its connection to the equipment; the plastic guiding member being split to facilitate its insertion into the steel ring and its removal therefrom.

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4,941,276

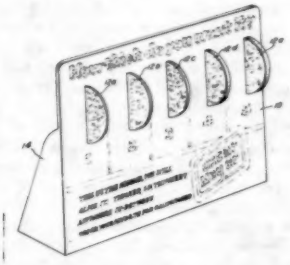
## MARKETING DISPLAY DEVICE

Donald R. Kanner, 2324 N. Greenview St., Chicago, Ill. 60614

Filed Mar. 20, 1989, Ser. No. 325,856

Int. Cl.[5] G09F 1/08

U.S. Cl. 40—538 1 Claim



1. A three dimensional display device for facilitating the selection of sliced food according to its thickness comprising;

a display panel having a front face and a rear face,

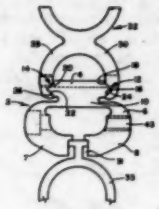
a series of semi-circularly shaped discs projecting outwardly from the front face of the display panel,

each said disc in the series of discs being of progressively increasing thickness, and

tactually discernible indicia printed on the front face of the display panel adjacent each said disc designating numerically the relative thickness thereof,

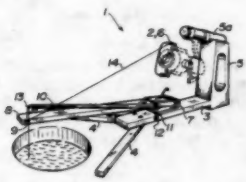
whereby the purchace of sliced food can be easily determined beforehand by visual and tactile examination of the display.

4,941,277
MOUNT FOR FIREARM SIGHT
Joseph A. Lawlor, Rte. 1, Box 149C, Emon Valley, Pa. 16120
Filed Nov. 15, 1988, Ser. No. 271,529
Int. Cl.[5] F41G 1/387
U.S. Cl. 42—100 26 Claims



1. A device used to carry a mount for a firearm sight, said device comprising:
an upper portion having surfaces constructed and arranged to receive mounting structure of a firearm sight;
a lower portion comprising jaw members adapted to grasp a firearm;
a central portion joining said upper portion and said lower portion, said upper, central and lower portions forming a one-piece construction; and
fastening means adapted to urge said jaw members toward one another and into a firearm grasping position,
wherein said upper portion has dimensions sufficient to give said upper portion strength to resist substantial deformation during fastening by said fastening means,
said central portion has dimensions to give said central portion sufficient strength and ductility to assure a predetermined flexibility so as not to disturb said resistance to substantial deformation of said upper portion and to allow said jaw members to self-adjust to a plurality of fastening positions during fastening by said fastening means, and
said lower portion has dimensions so as to resist substantial deformation during fastening by said fastening means.

4,941,278
VERTICAL FISHING TRIP-UP
Steve Verkuil, 32 Birch Road, Fort McMurray, Alberta, Canada (T9H 1J7)
Filed Dec. 6, 1989, Ser. No. 446,725
Int. Cl.[5] A01K 91/06
U.S. Cl. 43—15 4 Claims

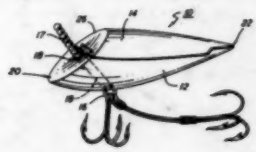


1. A device for hooking a fish which comprises:
a base member;
a fishing rod;
a generally V-shaped leaf spring, said spring having one leg thereof mounted on said base member and the other leg thereof being secured to the inner end of said rod;
a reel support means, said means being associated with said base member;
a reel having a fishing line associated therewith, said reel being mountable on said reel support means;
trigger means adapted to maintain said spring in a compressed position until a fish actuates the trigger means whereupon said spring is released and said fishing rod moves upwardly; and
a stop member associated with said fishing rod to limit the upward movement thereof.

4,941,279
FISHING LURE
Sandra G. Swanson, R.D. Box 89, Randolph, N.Y. 14772
Filed May 22, 1989, Ser. No. 354,788
Int. Cl.[5] A01K 91/02
U.S. Cl. 43—42.22 6 Claims

1. A fishing lure, comprising
(a) an elongated body member formed of buoyant material for floating on the surface of a body of water;
(b) a weight connected with the bottom of said body member toward one end thereof, said weight serving to orient said body member in an upright position on the surface;
(c) a bait support arm connected with the other end of said body member and extending from the top thereof upwardly and rearwardly and including means at the remote end thereof adapted for connection with a fish hook and the like, said support arm being formed of a rigid, bendable material, whereby the distance of said arm remote end from the surface of the body of water may be varied in accordance with the configuration of said arm; and
(d) means connected with the top of said body member adjacent said one end for attaching the lure to a fishing line, whereby when the lure is cast into the body of water, the lure will assume an upright position and suspend a fish hook, fly, or piece of bait above the water at the rear of the lure.

4,941,280
TWO-PIECE BODY FISHING LURE
George M. Rinaldi, 6 Green St., Camillus, N.Y. 13031, assignor to George Matthew Rinaldi, Camillus, N.Y.
Filed Sep. 7, 1989, Ser. No. 404,420
Int. Cl.[5] A01K 83/00
U.S. Cl. 43—42.36 7 Claims



1. A body type fishing lure which comprises a lower body part and an upper body part that is slidably attached to said lower body part so that said upper body part is interchangeable with similar upper body parts to change the appearance of the lure, said lower body part having longitudinally oriented key-

way on an upper surface thereof, and said upper body part having engaging means longitudinally oriented on a lower surface thereof slidably mating with said keyway so that said upper body part is slidably removable from said lower body part.

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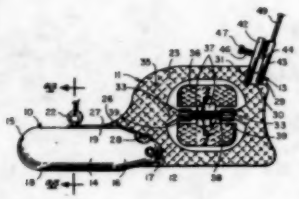
**4,941,281**
**DOWNRIGGER WITH LEVERAGE LINE CLAMP AND FISH ATTRACTING MEANS**

**Roger H. Vitale, 3324 N. Government Way, Coeur d'Alene, Id. 83814, and Ronald F. Howard, S. 109 Neyland #3, Liberty Lake, Wash. 99019**

**Filed Aug. 21, 1989, Ser. No. 396,108**
**Int. Cl.[5] A01K *91/00***
**U.S. Cl. 43—43.12** **15 Claims**



1. A troll fishing downrigger, having fish attracting means and a leveraged line clamp that releasably attaches a fishing line, comprising in combination:

an elongate body having a streamlined shaped for low drag motion in water, and means for attachment of a downrigger line in its upper portion;

a vertical stabilizing fin carried by the body and defining a medial propeller void and propeller connecting means;

a propeller having means to rotatably interconnect with the propeller connecting means of the stabilizing fin to mount the propeller for rotary motion in the propeller void; and

a line clamp, carried by the upper portion of the stabilizing fin, having

forward and rearward spaced clamp arms extending a spaced distance upwardly from the stabilizing fin with other to form clamping surfaces in their upper portions,

means to adjustably bias the clamp arms toward each other, and

an elongate line arm extending a spaced distance upwardly from the rearward clamp arm with means for releasably fastening a fishing line in the upper end portion of the line arm.

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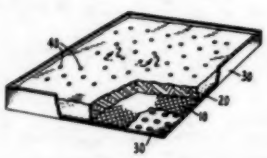
**4,941,282**
**WILDFLOWER SOD MAT AND METHOD OF PROPAGATION**

**Gene Milstein, 2152 E. Montane, Golden, Colo. 80401**

**Filed Dec. 29, 1987, Ser. No. 139,195**
**Int. Cl.[5] A01C *1/04***
**U.S. Cl. 47—58** **8 Claims**



1. A new and improved method of propagating wild flowers in sod mats outdoors on the ground comprising the following steps:

providing a sheet of perforated polyethylene;

positioning a sheet of polyester fabric atop said perforated polyethylene;

depositing a layer of planting medium on said perforated polyethylene polyester fabric combination;

spreading viable wild flower seed over said medium;

moistening said medium and seeds; germinating seeds in said medium, such that the roots of said seedlings mesh with the resulting perforated polyethylene sheet and polyester fabric combination forming a sod mat;

removing said mat from said perforated polyethylene polyester fabric combination;

and cutting said sod mat into sections for packaging, storage and installation.

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**4,941,283**
**SUPPORT STRUCTURE FOR MULTIPLE PLANTS**

**Edward Armstrong, P.O. Box 651-613, Louisa, Va. 23093**

**Filed Nov. 10, 1987, Ser. No. 118,896**
**Int. Cl.[5] A47G *7/04*; F16M *11/32***
**U.S. Cl. 47—67** **4 Claims**

1. A method of supporting multiple plants from a plant support structure which comprises:

three legs forming a tripod, said three legs being joined at their top;

a platform attached to the top of said tripod;

a rod extending downward from the area below said platform with a suspension means attached to the free end of said rod; and

at least one set of three crossbars attached to and extending between said legs of said tripod without said crossbars extending through the central area between said legs;

wherein at least one plant is seated on said platform and at least one plant is suspended from said suspension means at the free end of said rod.

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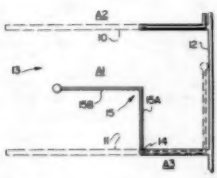
**4,941,284**
**PARKING SPACE BARRIER**

**David Stoller, 904 Winnington Avenue, Ottawa, Ontario, Canada (K2B 5C7)**

**Filed Dec. 15, 1989, Ser. No. 451,186**
**Int. Cl.[5] E05F *13/00***
**U.S. Cl. 49—49** **14 Claims**



1. In a parking area having defined parking spaces, apparatus

preventing unauthorized entry into selected individual ones of such spaces, said apparatus at each selected space comprising a vertical post disposed adjacent a marginal edge of the parking space, a generally L-shaped arm lying substantially in a horizontal plane, means mounting said arm adjacent one end thereof, on said post, means permitting arcuate movement of said arm about the vertical axis of said post from one to the other of two positions where in one position the legs of the L-shaped arm are aligned with two adjoining marginal edges of the parking space allowing use of the space for parking a vehicle and in the other position project into the area between the marginal edges of the parking space forming a barrier preventing a vehicle from parking in such space and means, controlled from a position remote from said apparatus selectively to cause arcuate movement of the arm from said one position to the other.

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**4,941,285**

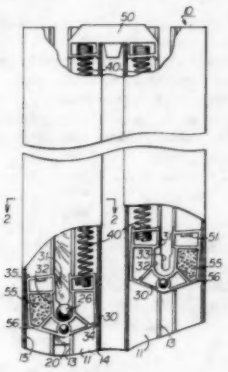
## LIFT-OFF SHOE SYSTEM FOR TILT WINDOW

**Norman R. Westfall, Rochester, N.Y., assignor to Caldwell Manufacturing Company, Rochester, N.Y.**

**Filed Oct. 17, 1989, Ser. No. 422,669**

**Int. Cl.[5] E05D *15/22***

**U.S. Cl. 49—176** **30 Claims**



1. A shoe system for a tilt window having a sash that moves vertically between a pair of jamb liners, tilts from the plane of said jamb liners, and has a pair of sash pins that extend into a pair of spring counterbalanced, nonlocking shoes that move vertically within said jamb liners, said shoe system comprising:

a. said shoes having top opening slots that receive said sash pins;

b. said pins having heads that interlock with said slots and prevent lateral withdrawal of said pins from said shoes; and

c. said pins being removable from said shoes only by lifting said pins upward out of said top opening slots into a region above uppermost positions of said shoes.

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**4,941,286**

## TENSIONING DEVICE FOR CABLE WINDOW LIFTER

**Klaus Marscholl, Ehringshausen, and Thomas Medebach, Wetzlar, both of Fed. Rep. of Germany, assignors to Kuster & Co. GmbH, Ehringshausen, Fed. Rep. of Germany**

**Filed Aug. 31, 1989, Ser. No. 400,546**

**Claims priority, application Fed. Rep. of Germany, Sep. 1, 1988, 3829680**

**Int. Cl.[5] E05F *11/48***

**U.S. Cl. 49—352** **1 Claim**

1. A cable actuated window lifter, comprising:

an actuating drum mounted in the body of a vehicle,

a window drive bracket mounted for vertical adjustment in said vehicle body,

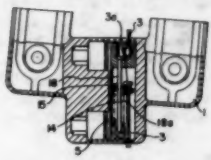
a cable actuated by said drum with a first end solidly joined to said drive and having a second end,

a tensioning device defined by a directional lock mounted on said drive bracket and connected to said second end, and said directional lock comprising:

a cogged rack,

a part displaceable relative to said rack having cog means for engaging said rack and articulated on said second end,

a compression spring surrounding said cable and located between said bracket and said displaceable part for compensation of cable elongation, said first compression



spring always stressing said displaceable part with said second cable end articulating on it in the direction of cable tautening relative to said drive bracket, and

said displaceable part comprising a small plate and said cogged rack comprising a pin with cogs, said small plate by means of an aperture slipping on said pin and engaging by means of said aperture edge said cogs of said cogged rack, and said second cable end linked in articulating manner to said small plate and acting on said compression spring which initially tips said small plate on said pin during cable elongation in the direction of cable tautening and, upon further cable elongation, forces said small plate out of a first cog and into a second cog.

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**4,941,287**

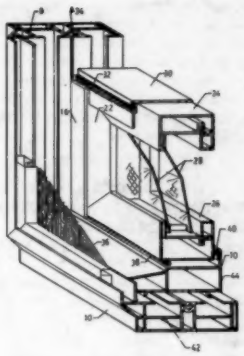
## WINDOW HAVING PIVOTAL STEP

**Volker Guelck, 114 Columbia Street West, Waterloo, Ontario, Canada (N2L 3K8)**

**Continuation-in-part of Ser. No. 184,592, Apr. 21, 1988, abandoned. This application Feb. 13, 1989, Ser. No. 309,134**

**Int. Cl.[5] E05D *15/00***

**U.S. Cl. 49—455** **19 Claims**



1. A window comprising an inner sash and an outer sash slidably mounted relative to one another in a frame, each sash having releasable locking means so that each sash can be tilted relative to said frame or removed completely from said frame

as desired for cleaning or other purposes, the inner sash having a pivotal step extending along one length of an outer surface thereof, said step having a cane-shaped cross-section with a curved portion of said cross-section seated in an arcuate channel in said frame, said step being pivotal through substantially ninety degrees so that when said outer sash has been tilted relative to said frame, said step can be rotated from a position parallel to said inner sash to a position perpendicular to said inner sash so that it will not interfere with said outer sash when it is tilted, said step being held in position parallel to said sashes when they are slidably mounted relative to one another within said frame.

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**4,941,288**

**WINDOW ASSEMBLY OF RIGID PLASTICS MATERIAL**

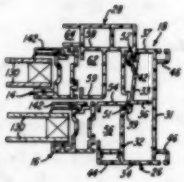
**Philip G. Morton, Germantown, Ohio, assignor to Dayton Extruded Plastics, Inc., Springboro, Ohio**

**Continuation of Ser. No. 115,895, Nov. 2, 1987, Pat. No. 4,831,781. This application May 19, 1989, Ser. No. 354,497**

**The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.**

**Int. Cl.[5] E06B *1/30***

**U.S. Cl. 49—504** **18 Claims**



1. A window assembly adapted for use in a vertical wall of a building, comprising a generally rectangular frame supporting a generally rectangular light transmitting window unit, said frame including a pair of elongated vertical jamb members connected by a horizontal head member and a horizontal sill member, each of said members being formed from an extrusion of rigid plastics material, each of said jamb members including an extruded outer section and an extruded inner section, each of said inner sections defining an inwardly facing recess for receiving said window unit, said sill member having an inclined wall portion sloping downwardly and outwardly from siad window unit, said outer sections of said jamb members each including a corresponding inclined wall portion and having a cross-sectional profile generally the same as the cross-sectional profile of said sill member, said inner sections of said jamb members disposed between said window unit and the corresponding said inclined wall portions of said outer sections, means connecting each of said inner sections to the corresponding said outer section, and said outer sections of said jamb members having mitered corner joints with said sill member and said head member.

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**4,941,289**

**REFRIGERATOR DOOR FRAME WITH INSULATED MULLION**

**Matthew Rolek, Chicago, Ill., assignor to Ardco, Inc., Chicago, Ill.**

**Continuation-in-part of Ser. No. 131,182, Dec. 10, 1987, Pat. No. 4,852,303. This application Mar. 24, 1989, Ser. No. 328,472**

**Int. Cl.[5] E06B *1/32***

**U.S. Cl. 49—504** **35 Claims**

1. A refrigerator door assembly mountable within the opening in the wall of a refrigerated cabinet comprising

a door mounting frame having an outer peripheral portion mountable within said cabinet opening,

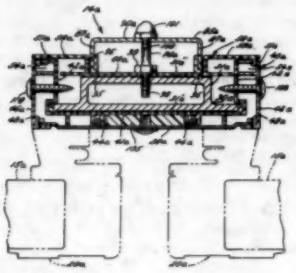
a plurality of insulated doors mounted for pivotal movement on said frame,

said frame including at least one mullion extending between top and bottom sides thereof and against which said doors close,

said mullion including a first metallic structural frame member,

a plastic insulating plate positioned rearwardly of said first metallic frame member.

said mullion including a first metallic structural frame member,



a plastic insulating plate positioned rearwardly of said first metallic frame member,

a metallic channel shaped frame member having forwardly directed legs engageable with said insulating plate, and

means extending through said plastic insulating plate positively interconnecting said first and channel shaped frame members with said plastic insulating plate interposed therebetween.

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**4,941,290**

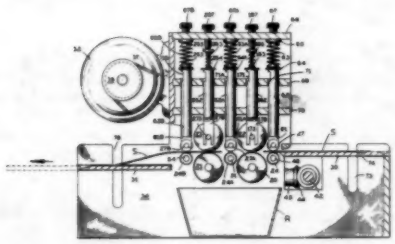
**APPARATUS FOR REMOVING PHOTOGRAPHIC IMAGES FROM A FILM MEMBER**

**Robert H. Holyoke, 4001 N. Ocean Blvd., Apt. 301B, Boca Raton, Fla. 33431**

**Filed Jan. 23, 1989, Ser. No. 299,796**

**Int. Cl.[5] B24B *7/00***

**U.S. Cl. 51—74 R** **20 Claims**



1. A photographic image removal apparatus for use with a photographic film member having photographic images on one face thereof, said apparatus comprising:

abrading roller means mounted for rotation;

means for advacing the film member tangentially past said abrading roller means at a predetermined speed along a predetermined path;

pressure roller means resiliently engaging the oppositive face of said film member and biasing said film member against said abrading roller means for scraping engagement of said abrading roller means against said one face of the film member;

and means for rotating said abrading roller means at a surface velocity several times said predetermined speed of said film member;

said abrading roller means comprising first and second abrading rollers spaced apart along said path of said film member and each having surface discontinuities thereon for scraping photographic images from said film member;

and said pressure roller means comprising a first set of pressure rollers located directly opposite said first abrading roller and a second set of pressure rollers located directly opposite said second abrading roller;

the pressure rollers of said first set being spaced apart axially along said first abrading roller to hold corresponding segments of the film member resiliently against said first abrading roller;

the pressure rollers of said set being spaced apart axially along said second abrading roller at remaining segments of the film member to hold said remaining segments of the film member resiliently against said second abrading roller.

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**4,941,291**

## DEVICE FOR CENTERING OF OPTIC LENSES IN A MECHANICAL MOUNTING, IN PARTICULAR DURING EDGE CUTTING AND BEVELLING

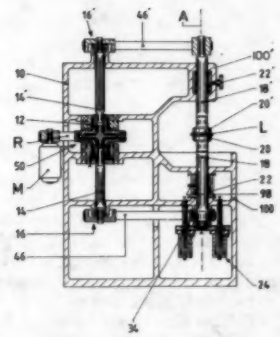
**Erhard Brueck, Heuchelheim, Fed. Rep. of Germany, assignor to Wilhelm Loh Wetzlar Optikmaschinen GmbH & Co. KG, Wetzlar, Fed. Rep. of Germany**

**Filed Dec. 23, 1988, Ser. No. 289,903**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1987, 3744116**

**Int. Cl.[5] B24B *5/04, 9/14;* B23B *19/02, 23/04***

**U.S. Cl. 51—105 L G** **10 Claims**




1. A device for centering optic lenses in a mechanical mounting for edge cutting and bevelling, comprising:

a housing, and means for defining at least one air bearing in said housing;

a pair of coaxially aligned guide sleeves supported in said housing, at least one said guide sleeve being radially adjustably supported in said housing by said air bearing, and support bearings provided in said guide sleeves;

a pair of coaxially aligned centering spindles rotatably and axially slidably supported on said support bearings in respective said guide sleeves, each said centering spindle having a pair of axial ends, one said end of one said centering spindle being adjacent one said end of the other said centering spindle, said adjacent ends carrying clamping cups thereon for clamping a lens therebetween;

a drive mechanism for rotating said centering spindles; and

clamping means for moving one said centering spindle and the associated said clamping cup axially toward the other said centering spindle and associated said clamping cup.

**4,941,292**

## DEVICE FOR CLAMPING A DISC-SHAPED TOOL

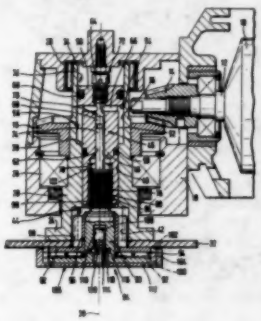
**Boris Rudolf, Stuttgart, and Josef Gentischer, Weinstadt, both of Fed. Rep. of Germany, assignors to C. & E. Fein GmbH & Co., Stuttgart, Fed. Rep. of Germany**

**Continuation of Ser. No. 293,299, Jan. 4, 1989, abandoned, which is a continuation-in-part of Ser. No. 72,171, Jul. 10, 1987, Pat. No. 4,779,382. This application Jan. 22, 1990, Ser. No. 465,639**

**Claims priority, application Fed. Rep. of Germany, Jan. 9, 1988, 3800437**

**Int. Cl.[5] B24B *23/02***

**U.S. Cl. 51—168** **35 Claims**



22. Device for clamping a disc-shaped tool on a motor-driven tool spindle of a portable machine tool, comprising:

a grinding disc on an angle grinder;

a clamping anchor arranged in said tool spindle which has an axial recess, said clamping anchor being axially displaceable relative to said tool spindle and rotationally fixedly connected to said tool spindle;

a clamping flange releasably attachable to the free end of said clamping anchor;

an abutment arranged at the tool end of the tool spindle;

means actuatable by a manual actuating mechanism for releasably pressing said clamping flange against said abutment, thereby clamping said tool between these, said means for releasably pressing comprising;

a first pressure cylinder including a first cavity (56) between said clamping anchor (46) and said tool spindle (20);

a second pressure cylinder including a second cavity (70) arranged in said clamping anchor (46) or said tool spindle (20); and

a connecting channel (66) between said two cavities (56, 70);

said second pressure cylinder including a piston (68) delimiting said second cavity (70), and in order to releasably clamp said tool (22), said piston (68) being adjustable and fixable in its position in which it clamps said tool (22) by said manual actuating mechanism from a tool end of said tool spindle (20);

said first cavity (56) defined by delimiting surfaces (38, 54) of said tool spindle (20) and said clamping anchor (46), with said delimiting surfaces facing one another and being arranged in axially spaced relation to one another;

said manual actuating mechanism being operable via a retaining device (84) for securing said clamping flange (82) on said clamping anchor (46); and

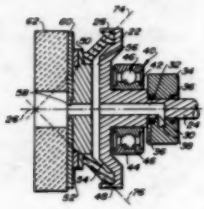
said retaining device being releasably attachable to said clamping anchor (46).

4,941,293

## FLEXIBLE ROCKING MOUNT WITH FORWARD PIVOT FOR POLISHING PAD

Donald L. Ekhoff, 2600 Day Rd., Gilroy, Calif. 95020

Filed Feb. 7, 1989, Ser. No. 307,693
Int. Cl.[5] B24B 41/00
U.S. Cl. 51—168 10 Claims



1. A mounting apparatus for a finishing member of the type frictionally contacting a planar surface to be finished, comprising,

a rotatable carrier having a face and having an axis of rotation substantially perpendicular to a planar surface to be finished, and

an annular elastomeric sleeve coaxial with said axis of rotation and coupled to said face of the carrier for supporting a finishing member on a forward side of said annular sleeve opposite to the face of the carrier, said annular member defining a rocking center on said axis of rotation for rocking of said finishing member, said rocking center being beyond the axial extent of said annular sleeve at said forward side.

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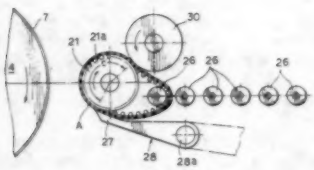
4,941,294

## GRINDING MACHINE FOR BELT MATERIALS

Toshio Nakagaki, Kobe, Japan, assignor to Bando Kagaku Kabushiki Kaisha, Kobe, Japan

Filed Jul. 31, 1989, Ser. No. 386,973
Claims priority, application Japan, Sep. 16, 1988, 63-233356
Int. Cl.[5] B24B 1/00, 7/06
U.S. Cl. 51—328 5 Claims



1. A grinding machine for belt materials comprising a rotary support means for supporting a belt material to be ground, said support means having a rotatable work roll with a large diameter, a driving unit for rotating said work roll in a direction of rotation, and at least one rotatable idler shaft being provided at a predetermined distance away from the work roll, said support means being arranged to support the belt material between said work roll and said idler shaft, and said support means being arranged to face a grinding belt over a contact wheel of a belt grinder and including movement means whereby said support means and said grinding belt may be brought towards and away from each other at a point of contact, and a squeezing roll and conforming means mounted adjacent said support means and arranged to face each other on opposite sides of said point of contact between the belt material to be ground over said work roll and the grinding belt on said contact wheel, said squeezing roll being past said point of contact in said direction of rotation of the work roll, said conforming means being prior to said point of contact in said direction of rotation of the work roll, each being provided with an actuating means so that they may be forced into contact under pressure with said belt material to be ground.

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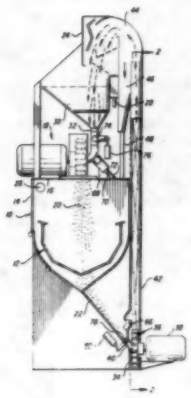
4,941,295

## ABRASIVE ELEVATING APPARATUS FOR BLAST MACHINES AND METHOD OF USING

James H. Carpenter, Hagerstown, Md., assignor to Pangborn Corporation, Hagerstown, Md.

Filed Apr. 12, 1989, Ser. No. 337,158
Int. Cl.[5] B24C 9/00
U.S. Cl. 51—425 14 Claims



1. In a blast means where used abrasive particles are collected and recirculated, an abrasive particle return system, said system comprising supply means for supplying said blast means, receiving means for receiving returning abrasive particles, a rotating abrasive particle throwing wheel in the form of an impeller having vanes radiating from a center of the wheel, the center of the wheel being located below the receiving means, delivery means between said receiving means and said throwing wheel for delivering used abrasive particles to said throwing wheel, and an elevating casing directly connected to a discharge of said throwing wheel for directly receiving abrasive particles from said throwing wheel and delivering abrasive particles to said supply means.

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4,941,296

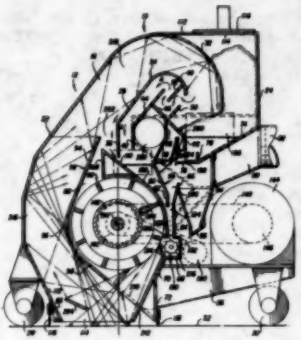
## SURFACE CLEANER

James H. Carpenter, Hagerstown, Md., assignor to Pangborn Corporation, Hagerstown, Md.

Filed May 12, 1987, Ser. No. 48,940
Int. Cl.[5] B24C 5/06, 9/00
U.S. Cl. 51—433 17 Claims

1. In combination with a rotating abrasive particle primary batting wheel having batting vanes with outer ends, a gravity abrasive particle supply passage for providing downwardly flowing abrasive particles, and a second batting wheel for

intercepting flowing abrasive particles and batting such abrasive particles radially into said primary batting wheel between



said batting vane outer ends and into the path of each batting vane at an accelerated speed.

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**4,941,297**

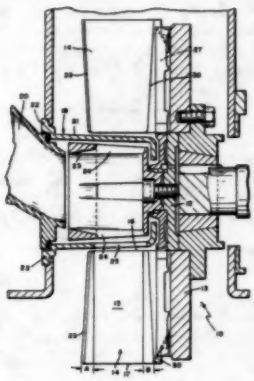
**FLARED VANE FOR ABRASIVE BLASTING WHEEL**

**James H. Carpenter, Hagerstown, Md., assignor to Pangborn Corporation, Hagerstown, Md.**

**Continuation of Ser. No. 509,656, Jun. 30, 1983. This application Aug. 13, 1985, Ser. No. 765,363**

**Int. Cl.[5] B24C *5/06***

**U.S. Cl. 51—434** **11 Claims**



1. An abrasive blasting wheel assembly comprising a rotor, a runnerhead concentrically mounted on said rotor for rotation at a predetermined operating RPM, a plurality of spaced radially arranged abrasive particle throwing vanes, means detachably securing said vanes to the face of said runnerhead, impeller means carried by said rotor for feeding particulate abrasive material to said vanes, each of said vanes being provided with an abrasive throwing face having a radially extending centerline, said face being disposed perpendicular to the face of said runnerhead and having spaced side portions flaring away from an abrasive receiving heel end portion of said vane to a discharge end of said vane at a continuous uninterrupted flare angle in the range of 2° to 7° as measured relative to the centerline of said face from said heel end to said discharge end.

**4,941,298**

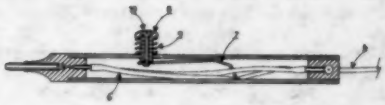
**REAR RESERVOIR MICRO SANDBLASTER**

**Mark Fernwood, 1341 Camino Tassajara, and Thomas S. Blake, 881 Danville Blvd., both of Danville, Calif. 94526**

**Filed Sep. 28, 1988, Ser. No. 250,775**

**Int. Cl.[5] B24C *7/00, 5/02***

**U.S. Cl. 51—438** **7 Claims**



1. A lightweight, hand held apparatus for abrading, polishing, cleaning, or etching the surface of an object with a stream of fluid containing a mixture of pulverulent material and a gaseous medium, comprising a hollow elongated tube constituting a handle and a nozzle having at least one orifice to discharge the afor stream of fluid against the surface, a vortex mixing chamber for mixing the gaseous medium and pulverulent material, a means of receiving a compressed gas flow and urging the gaseous flow into the vortex mixing chamber, an air and pulverulent material receiving member disposed at one end of the tube for receiving an air supply line and a pulverulent supply line, a pulverulent supply reservoir, and a means to control the flow of the pulverulent material and gaseous medium mixture, wherein the means to control the flow of the pulverulent material and gaseous medium mixture comprises a pinch lever disposed inside the hollow elongated tube, wherein the pinch lever comprises a first portion, substantially parallel to the hollow elongated tube, connected to a pinch lever button at one end and to a second portion at the other end; the second portion is disposed at an angle relative to the first portion and the connection between the first and second portions form a pivot point against the inner wall of the hollow elongated tube; the second portion is connected to a third portion wherein the third portion is disposed at an angle relative to the second portion; the third portion consists of a rounded end portion to pinch the air supply line when the pinch lever button is depressed and a passageway to allow the pulverulent supply line to pass through the third portion to prevent the pulverulent supply line from being pinched.

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**4,941,299**

**GUARD SCREEN FOR A RAIN GUTTER**

**Ronald L. Sweers, 6165 E. Atherton Rd., Burton, Mich. 48519**

**Filed Mar. 17, 1989, Ser. No. 324,801**

**Int. Cl.[5] E04F *13/06***

**U.S. Cl. 52—12** **15 Claims**

1. In combination with roof boards of a roof having shingles laid thereover and a longitudinally extending rain gutter having a front lip, a guard screen interconnecting said boards and said gutter, said screen comprising:

an elongated screen body;

an elongated channel interconnected with said screen body extending longitudinally of said screen body;

an elongated flanged member interconnected with said screen body and extending longitudinally of said screen body, said flanged member including a flange;

said channel being interconnectable with said lip of said gutter;

said flange being disposable between said shingles and said roof boards;

said roof boards including a roof edge;

said flanged member including a roof board edge abutment rib;

said roof board edge abutment rib being abuttable against said front edge of said roof boards;

said screen body being composed of sufficiently resilient material whereby tension produced from the interconnection of said channel with said lip and said abutment rib with said front edge of said roof boards causes said body to resiliently arch.

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**4,941,300**

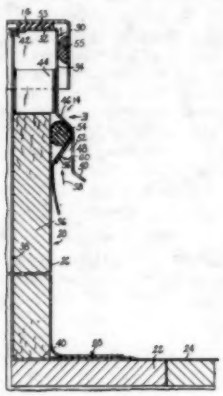
**ROOFING MEMBRANE TO ROOF OPENING SEALING SYSTEM AND HATCHWAY EMPLOYING SAME**

**George Lyons, Jr., P.O. Box 892, 20 W. Middle Beach Rd., Madison, Conn. 06443**

**Filed Apr. 5, 1989, Ser. No. 334,192**

**Int. Cl.[5] E04D *13/14***

**U.S. Cl. 52—58** **14 Claims**



1. A sealing system for sealing between a roofing membrane and a curb around a roof opening comprising:

a cap flashing for the curb;

a top flange connected to the cap flashing and extending outwardly therefrom;

a wall flange connected to the top flange and extending downwardly therefrom whereby a filler channel is defined by the top flange, the wall flange and the curb;

a longitudinal resilient filler material sized to fit closely within the filler channel and to hold the roofing membrane; and

a plurality of spaced-apart tabs integral with the wall flange, the tabs being inwardly bendable towards the curb whereby the filler and roofing membrane may be securely retained within the filler channel.

**4,941,301**

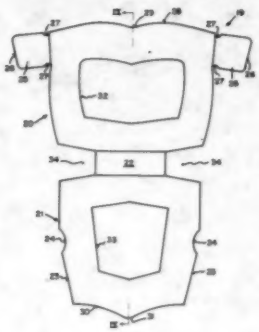
**ELEMENTS WITH OPENING**

**Rolf Scheiwiller, Buolterlistrass 9, CH-6052 Hergiswil, Switzerland**

**Continuation of Ser. No. 120,628, Nov. 13, 1987, abandoned. This application Sep. 25, 1989, Ser. No. 412,546**

**Int. Cl.[5] E02D *27/00***

**U.S. Cl. 52—102** **12 Claims**



1. A substantially sector-shaped lawn element comprising:

an upper part having an interior opening, a bottom portion and a longitudinal axis,

a lower part smaller than said upper part, said lower part having an interior opening, a top portion, lateral sides and a longitudinal axis coinciding with the longitudinal axis of said upper part, the lateral sides lying along planes forming a sector, and

a traverse connecting the bottom portion of said upper part with the top portion of said lower part,

said lawn element adapted to be joined with paving stones of corresponding shape and dimension in a seamless transition.

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**4,941,302**

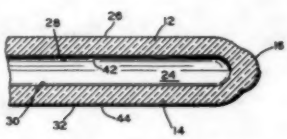
**INSULATING DOUBLE GLAZED WINDOW ASSEMBLY**

**Christopher J. Barry, Perrysburg, Ohio, assignor to Libbey-Owens-Ford Co., Toledo, Ohio**

**Filed Jun. 9, 1989, Ser. No. 364,785**

**Int. Cl.[5] E04B *3/24***

**U.S. Cl. 52—171** **10 Claims**



1. An insulating window assembly, said window assembly comprising:

(a) at least first and second sheets of glass spaced from one another at a width of 0.125 inch to 0.375 inch in face-to-face parallel relation, said first and second sheets of glass having opposed inwardly facing surfaces and outwardly facing surfaces;

(b) fused marginal edges wherein said first and second glass sheets are attached to one another.,

(c) at least one sealed air space, said air space disposed between said first and second glass sheets and filled with a gas; and

(d) a coating with low emissivity and high visible light

transmittance applied to at least one inwardly facing surface of one of said glass sheets and applied to the outwardly facing surface of the other of said glass sheets

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**4,941,303**

## ANCHORING DEVICES FOR TENSILE BRACES

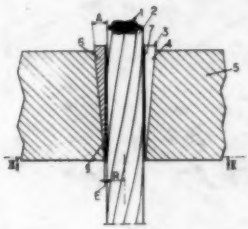
**Pierre Jartoux, Epernon, France, assignor to Freyssinet International (STUP), Coignieres, France**

**Continuation of Ser. No. 76,403, Jul. 22, 1987, abandoned. This application Nov. 8, 1988, Ser. No. 270,432**

**Claims priority, application France, Jul. 31, 1986, 86 11140**

**Int. Cl.[5] E04C *3/10***

**U.S. Cl. 52—223 L** **11 Claims**



1. A longitudinally split jaw for use in an anchoring device for a tensioned cable, which anchoring device has a housing with a frustoconic shaped passage formed therein, said jaw having a rough inner cylindrical surface along the entire length thereof and having an outer lateral surface of frustoconic shape such that said jaw has a tapered end and a half-angle at an apex of the outer lateral surface of the tapered end which is less than 10° and a radial thickness of an annular terminal section of said tapered end which is less than or equal to 1/10 of an inner radius of said tapered end; wherein when said jaw is positioned within the frustoconic shaped passage in the housing, the housing contiguously surrounds the totality of the tapered end of the jaw.

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**4,941,304**

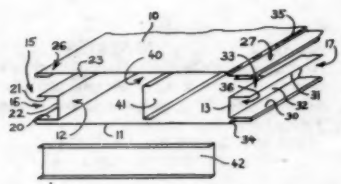
## INSULATION BODY

**Richard L. Lewellin, 6 Grimwade Crescent, Frankston, Victoria, 3199, Australia**

**Filed Aug. 17, 1989, Ser. No. 394,973**

**Int. Cl.[5] E04C *1/10***

**U.S. Cl. 52—580** **11 Claims**



1. An insulation panel having a back face and a front face, the back and front faces being spaced apart and being generally parallel to each other, the panel including a female edge having a recessed region along its length, the panel further including a male edge located at the opposite side of the panel to the female edge and which has a male shape which is complementary to the recessed region of the female edge so as to closely fit within the female edge of an adjacent similar insulation panel, the front face having two integral webs located at and extending respectively along the female and male edges of the panel, each web extending across substantially the entire distance separating the back and front faces so as to define a cavity within the panel, the cavity having a base wall defined by the front face and two opposed side walls defined by the webs at the female and male edges of the panel so that the cavity can receive and retain an insulating material filling for the panel, the web at the female edge of the panel being shaped so as to define the recessed region, the web at the male edge of the panel being shaped so as to define the male shape, each web having an edge portion remote from the front face and which turns out of the general plane of the web, the edge portions of the webs being secured to the back face of the panel.

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**4,941,305**

## REPAIR OF EDGE DEFECTS IN BOARDS OF LUMBER OR THE LIKE

**Thomas F. Cortese, 3333 Guido St., Oakland, Calif. 94602**

**Continuation-in-part of Ser. No. 383,448, Jul. 24, 1989, Pat. No. 4,894,971. This application Nov. 2, 1989, Ser. No. 430,378**

**Int. Cl.[5] E02D *37/00*; E04G *23/00*; B27G *1/00***

**U.S. Cl. 52—514** **17 Claims**

1. A repaired board of lumber or similar material having opposite parallel major surfaces and an edge surface which extends therebetween, said board having an opening in the original material of the board that extends to said edge surface and at which a defect in the edge region of the board has been removed in the course of cutting the opening in the board, said board further having a conforming plug of filler material filling said opening, and wherein a first region of said opening extends along said board for a greater distance than a second region of the opening that is situated closer to said edge surface of said board than said first region.

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**4,941,306**

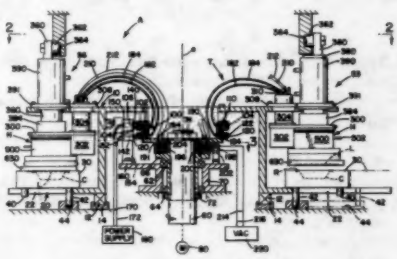
## APPARATUS AND METHOD FOR SEALING A LID ONTO A CONTAINER

**George D. Pfaffmann, Farmington Hills; Norbert R. Balzer, Warren, both of Mich.; Charles S. Kubis, Palos Heights; John Walter, Evergreen Park, both of Ill.; John P. Currie, and Graham R. Adams, both of Boaz, Ala., assignors to Continental Can Company, Inc., Norwalk, Conn.**

**Filed Oct. 7, 1988, Ser. No. 254,837**

**Int. Cl.[5] B65B *51/22, 51/14, 7/28***

**U.S. Cl. 53—306** **34 Claims**



1. In a device for sealing a flat lid with a lower layer of heat bondable material onto the upper, generally flat surface of a

generally flat flange extending around the periphery of an access opening in a container for hermetically storing a substance susceptible to deterioration when exposed to atmosphere for a prolonged time, said device comprising: a turret having a given number of circumferentially spaced stations; means for rotating said turret about a veertical axis whereby said stations move along a generally circular path; means for loading a container filled with said substance onto a station of said turret at a first position on said path; means for locating a lid over said container at a second position on said path; and, means for heating said heat bondable material while said lid is forced against said flange at a third position on said path whereby said lid is sealed onto said flange of said container wherein said heating means including a heating unit at each of said stations and each including a downwardly facing heating ring adapted to force said lid against said flange and electrical means for causing said ring to heat said lid in a pattern defined by said ring and extending around said flange periphery whereby said heat bondable material is heated to a lid sealing temperature along said pattern at said third position of said path; said electrical means comprising an high frequency power supply fixedly mounted with respect to said rotable turret, a switch plate having a given number of circumferentially spaced contacts rotatable with said switch plate as it is rotated in unison with said turret about said axis, bus means on said turret for fixedly connecting each ring of each of said heating units at a given station to a selected contact of said switch plate and brush means connected to said high frequency power supply and including brush contacts riding on said switch plate, said given number of contacts on said switch plate being spaced to correspond with said given number of stations whereby each of said heating units is energized by said power supply for an heating cycle while said energized heating unit is in a preselected arc of said third position of said path.

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**4,941,307**

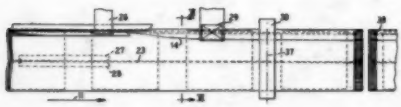
## ZIPPER GUIDE SYSTEM FOR FORM TOOLING

**John Wojcik, Des Plaines, Ill., assignor to Zip-Pak Incorporated, Northbrokk, Ill.**

**Filed Apr. 24, 1989, Ser. No. 342,354**

**Int. Cl.[5] B65B** *9/06, 61/18;* **B65D** *33/16*

**U.S. Cl. 53—412** **12 Claims**



1. The method of enclosing a product in a package having a reclosable zipper thereon, comprising the steps:

providing a continuous sheet of plastic film with reclosable rib and groove fastener profiles extending therealong parallel to the formation axis of the film with the profiles interlocked to form a flattened closure;

feeding the sheet forwardly along the formation axis and guidingly wrapping the sheet around an object to be wrapped;

simultaneously guiding the interlocked flattened closure to an upright position relative to the object;

thereafter flattening the flattened closure against the outer surface of a wall of the object;

and cross-sealing the film at the ends of the object locking the flattened profile to the package end.

**4,941,308**

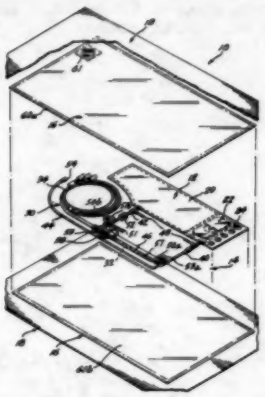
## METHOD OF PACKAGING FOR A STERILIZABLE CALIBRATABLE MEDICAL DEVICE

**Richard W. Grabenkort, Bearrington, Ill.; Scott P. Huntley, Concord, Calif., and Sheldon M. Wecker, Libertyville, Ill., assignors to Abbott Laboratories, Abbott Park, Ill.**

**Division of Ser. No. 224,425, Jul. 25, 1988, Pat. No. 4,863,016. This application Mar. 16, 1989, Ser. No. 324,181**

**Int. Cl.[5] B65B** *55/10, 55/22, 11/58*

**U.S. Cl. 53—425** **15 Claims**



1. A method of packaging a medical device comprising a hydratable sensor component, the method comprising the steps of:

disposing the sensor component within plumbing means adapted to reversibly establish fluid communication between a first reservoir, the sensor component, and a second reservoir, said first reservoir being substantially filled with a hydration solution suitable for hydrating the sensor component and said second reservoir being substantially evacuated, or between the sensor component and the ambient environment of said plumbing means; and,

sealing said medical device, said plumbing means, and said reservoirs within a wrap comprising a gas-permeable surface providing gaseous communication between the ambient environment of said wrap and the ambient environment of said plumbing means.

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**4,941,309**

## PANEL PACKAGING SYSTEM

**Stewart L. Fluent, Cedar Falls; Colin Hart, Waterloo, both of Iowa; Charles D. McCree, King of Prussia, and Charles F. Lotsch, Audubon, both of Pa., assignors to CertainTeed Corporation, Valley Forge, Pa.**

**Filed Mar. 2, 1989, Ser. No. 317,744**

**Int. Cl.[5] B65B** *35/50*

**U.S. Cl. 53—544** **12 Claims**

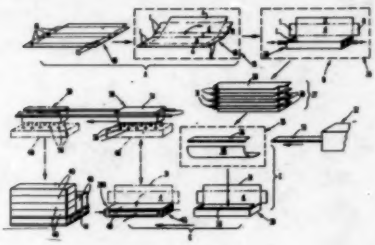
1. A panel packaging system wherein pre-determined corrugated paper blanks having score lines therein are formed into six-sided containers of pre-specified dimensions with a lid part still open and stacked adjacent a panel packing machine to be sequentially moved from a transfer area and filled by said machine with a predetermined number of extruded panels, closed completely and securely, and stacked on a pallet for shipment, comprising:

a. first folding means next to a plurality of corrugated paper blanks to fold substantially each of said blanks at predetermined score lines between individual sections thereof to preform a panel container;

b. second means to fold end sections of the preformed container, adjacent said first means, and having first glueing means and first securing means therein to securely and sealingly close the end sections and form a six-sided container having an opened lid section;

c. first moving means to move a plurality of lid-open, empty, containers to a first, pre-determined position, adjacent receiving means to receive a plurality of panels;

d. means adjacent said first moving means to receive at least one lid-open container and position said container in a pre-determined position, and further, to sequentially receive a pre-determined number of panels consecutively in a first orientation, re-orient a panel and combine said panel



with a second panel and pack said combined panels into one of said at least one container to fill said container;

e. second moving means adjacent said receiving means to move said filled container to a second, predetermined position where second glueing means and second securing means force the container lid section into conformance with the container body;

f. palletizing means suspended from above said second glueing and securing means to move said closed container from the second, predetermined position to a predetermined location on a pallet;

g. computer control means connected to said receiving means, said second moving means and said palletizing means to provide timing control thereto.

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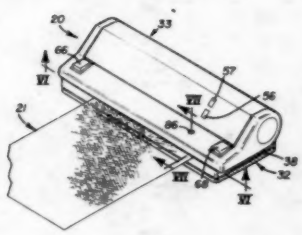
**4,941,310**

## APPARATUS FOR VACUUM SEALING PLASTIC BAGS

**Hanns J. Kristen, San Anselmo, Calif., assignor to Tilia Aktiengesellschaft, Vaduz, Fed. Rep. of Germany**

**Filed Mar. 31, 1989, Ser. No. 332,504**
**Int. Cl.[5] B65B *31/02***
**U.S. Cl. 53—512** **38 Claims**



1. An apparatus for vacuum sealing a plastic bag having overlying first and second panels defining an evacuative chamber and overlying heat sealable panel portions terminating at an open end of said bag communicating with said evacuative chamber, said apparatus comprising

a base defining an upper support surface adapted to receive the open end and sealable panel portions of said bag thereon,

a hood mounted on said base and movable to a closed position to position a frontal side thereof over the open end and sealable panel portions of said bag, said hood and base defining a vacuum chamber means therebetween having a width extending from a frontal side of said apparatus that is sized to only receive the open end of said bag in exposed relationship therein and to position remaining portions of said bag exteriorly of said apparatus,

static seal means circumventing said vacuum chamber means and disposed between said base and said hood for directly engaging outer surfaces of the sealable panel portions of said bag in response to movement of said hood to its closed position to form a static seal isolating only the open end of said bag and said vacuum chamber means from ambient and to maintain the open end of said bag in communication with the evacuative chamber thereof,

evacuation means communicating with said vacuum chamber means for selectively evacuating said vacuum chamber means and the evacuative chamber of said bag, and

heat sealing means, including a heating element mounted forwardly on one of said base and said hood, for selectively forming an air-tight heat seal across the sealable panel portions of said bag to maintain said vacuum within the evacuative chamber of said bag.

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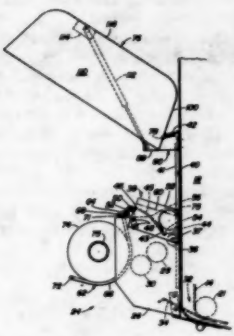
**4,941,311**

## WRAP MATERIAL ROLL HOUSING COVER HAVING SEALED HINGE JOINT AND GAS SPRING BIASING MEANS

**William A. Ardueser, Ottumwa; George W. Rumph, Bloomfield, and Henry D. Anstey, Ottumwa, all of Iowa, assignors to Deere & Company, Moline, Ill.**

**Filed Jun. 23, 1989, Ser. No. 370,555**
**Int. Cl.[5] B65B *11/04***
**U.S. Cl. 53—587** **5 Claims**



1. In a large round baler including support structure adjacent a bale-forming chamber, a bale wrapping mechanism mounted to the support structure and including a wrap material supply roll housing adapted for holding a supply roll from which wrap material is pulled during wrapping a bale located in the chamber, the improvement comprising: said housing including a generally upright first wall extending transversely across the bale-forming chamber and including an upper end portion defined by a flange extending away from said chamber; an upwardly facing wrap material roll support wall disposed below the flange and arranged for supporting a roll of bale surface wrap material in a zone adjacent the first wall and below said flange; a cover defined by top, bottom, opposite side and an upright second wall joined together to define an open face and for enclosing a roll of wrap material located in

said zone when the cover is in a closed position, the face then being closed by said first upright wall; and hinge means pivotally connecting said cover to said support structure for pivotal movement about a horizontal transverse axis between said closed position, wherein said top wall has an upper surface portion sealingly engaged with an under surface portion of the flange of the upright first wall and an open position wherein said open face is directed away from said first upright wall.

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**4,941,312**

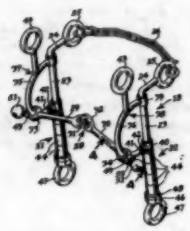
## BRIDLE BIT

**Ralph N. Old, Sr., Rte. 3, Box 311, Smithville, Tenn. 37166**

**Filed Jan. 17, 1989, Ser. No. 296,949**

**Int. Cl.[5] B68B *1/06***

**U.S. Cl. 54—8** **12 Claims**



1. A bit for a bridle having a cheek piece and reins, comprising:

(a) a pair of opposed rein lever members and a mouthpiece interconnecting said rein lever members,

(b) each of said rein lever members comprising an elongated shaft having an upper end portion and a lower end portion,

(c) means for connecting said lower end portions to the corresponding reins of a bridle,

(d) said mouthpiece comprising a broken snaffle bit member having outer end portions,

(e) said mouthpiece further comprising a connector member for each shaft having an elongated shank portion and journal means connecting each said connector member to a corresponding said shaft for swiveling movement of said shank portion about the longitudinal axis of said corresponding shaft,

(f) coupling means connecting each outer end portion of said bit member to a corresponding shank portion for pivotal and axial movement of said bit member relative to said shank portions, and

(g) means for connecting said mouthpiece to the cheek piece of said bridle.

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**4,941,313**

## HUMANE TRAINING AID WITH ADJUSTABLE MUZZLE LOOP HAVING AN ADJUSTABLE LOCKING DEVICE

**Robert K. Anderson, Roseville; Ruth E. Foster, Minneapolis, and Bertyl W. Carlson, Richfield, all of Minn., assignors to Regents of the University of Minnesota, Minneapolis, Minn.**

**Continuation-in-part of Ser. No. 169,294, Mar. 17, 1988, which is a division of Ser. No. 922,157, Oct. 23, 1986, Pat. No. 4,741,288, which is a continuation-in-part of Ser. No. 719,692, Oct. 4, 1985, Pat. No. 4,621,591. This application Jul. 22, 1988, Ser. No. 223,157**

**The portion of the term of this patent subsequent to Nov. 11, 2003, has been disclaimed.**

**Int. Cl.[5] B68B *1/02***

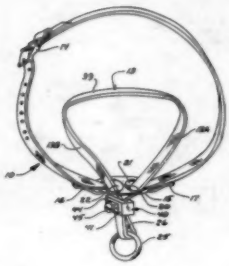
**U.S. Cl. 54—24** **6 Claims**

1. A combination collar and muzzle humane training aid for a dog having a neck, head, eyes, a lower jaw and a muzzle extending forwardly from the eyes, said humane training aid comprising:

an adjustable collar adapted to fit closely around the neck of a dog on which the humane training aid is placed, and to fit close to the head;

a ring carried by such said collar, said ring being mounted at a position underneath the neck of a dog on which the adjustable collar of the training aid is mounted immediately to the rear of the lower jaw;

a muzzle loop freely slidably passing through said ring and of size to form a loop over a muzzle and immediately adjacent and forward of, eyes of a dog on which the humane training aid is placed, said muzzle loop having a



portion extending below the ring, comprising a pair of lower strap portions; and

an adjustable lock means on the lower strap portions of the muzzle loop below the ring, said lock means including a housing receiving both of said lower strap portions, and means for affixing the strap portions to each other and for securing the lock means at a fixed location thereon, said lock means being prevented from passing through the ring, to thereby fix the size of the muzzle loop portions passing over a muzzle relative to the ring without restraining free movement of the muzzle loop as the lock means is moved away from the ring to apply pressure to a muzzle of a dog wearing the humane training aid.

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**4,941,314**

## APPARATUS FOR TREATING TAIL YARN IN TEXTILE SPINDLE ASSEMBLY

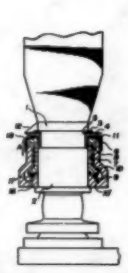
**Kunimitsu Odawara, Hiroshima, Japan, assignor to Odaware Industry Co., Ltd., Hiroshima, Japan**

**Filed Aug. 16, 1989, Ser. No. 394,577**

**Claims priority, application Japan, Aug. 31, 1988, 63-113492**

**Int. Cl.[5] D01H *1/38***

**U.S. Cl. 57—299** **4 Claims**



1. An apparatus for treating a tail yarn in a textile spindle assembly having a spindle with a base portion, said apparatus comprising:

an upper slit ring fixedly mounted on the base portion of the spindle,

a cylindrical member having a lower slit ring at an upper end thereof and a lower portion outwardly expandable by centrifugal force, and

a guiding surface fixed on a lower part of said base portion of the spindle,

said cylindrical member being axially slidably mounted on said base portion of the spindle beneath said upper slit ring such that a lower end of the expandable lower portion thereof is in contact with said guiding surface,

said upper slit ring and said lower slit ring being pressed together to form a tail yarn gripping means,

said lower portion of said cylindrical member being expandable in the presence of a centrifugal force to cause said cylindrical member to slide axially downward to release a pressed state between said upper slit ring and said lower slit ring,

spring means for positively restoring said lower portion of said cylindrical member from an expanded state to an initial state upon standstill of the spindle, and

said lower portion of said cylindrical member being split by a plurality of slits.

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**4,941,315**

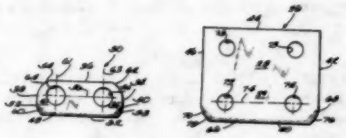
## WEAR RESISTANT CHAIN FOR TRENCHERS

**John H. Thuerman, West Allis, Wis., assignor to Rexnord Corporation, Milwaukee, Wis.**

**Filed Feb. 13, 1989, Ser. No. 310,240**

**Int. Cl.[5] F16G *13/08***

**U.S. Cl. 59—78** **47 Claims**



1. A chain comprising a plurality of chain links joined together by chain pins, at least one of the chain links including a sidebar having a first edge adapted to be supported in sliding contact with a supporting surface, said first edge being generally linear and extending in the direction of movement of the chain with respect to the support surface, and the sidebar including an opposite edge spaced from and generally parallel to said first edge, a trailing end having a first pitch hole therethrough and a leading end having a second pitch hole therethrough, the pitch holes housing said chain pins, and at least one of the leading end and the trailing end of the sidebar including an induction hardened portion adjacent the first edge.

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**4,941,316**

## CHAIN ASSEMBLY

**Stephen K. Bechtold, 306 Ocean Ave., Northport, N.Y. 11768**

**Division of Ser. No. 96,947, Sep. 15, 1987, Pat. No. 4,878,345. This application Apr. 3, 1989, Ser. No. 332,468**

**Int. Cl.[5] F16G *13/20***

**U.S. Cl. 59—78** **5 Claims**

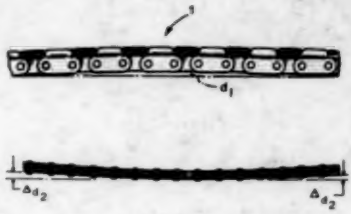
1. A chain for opening a window or the like, comprising:

a plurality of interconnected links, each of said links including a plate portion and a flange portion extending at an angle with respect to said plate portion, each of said links being formed from a non-corrosive material which is not amenable to overbending;

a pair of openings extending through said plate portions of each of said links, said openings each having a diameter, the diameter of said openings being formed with tolerances not exceeding 0.00025 inch;

a plurality of rivets extending, respectively, through each of said openings and connecting said links, each of said rivets including first and second heads connected by a substantially straight, cylindrical shank; said rivets being formed from cylindrical blanks, the diameters of said blanks being within tolerances of 0.00025 inch;

said links being constructed and interconnected so as to provide longitudinal rigidity so that said interconnected



so links can be used to push a window or the like, to provide lateral flexibility to conform to an arcuate path traversed by a swinging window or the like, and to provide longitudinal flexibility to allow each of said interconnected links to freely rotate about said respective rivets between a first position providing said longitudinal rigidity and a second position wherein said interconnected links assume a curved configuration.

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**4,941,317**

## NOSE BULLET ANTI-ICING FOR GAS TURBINE ENGINES

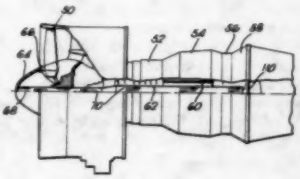
**Paul C. Ivey, West Chester, Ohio, and John M. Owen, Brighton, England, assignors to Rolls-Royce plc and Ruston Gas Turbines Limited, both of, England**

**Filed Apr. 13, 1989, Ser. No. 337,468**

**Claims priority, application United Kingdom, Apr. 14, 1988, 8806785**

**Int. Cl.[5] F02C *7/047***

**U.S. Cl. 60—39.093** **7 Claims**



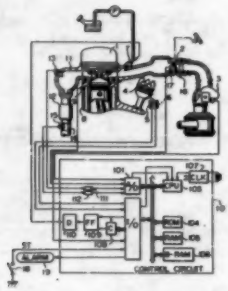
1. In a gas turbine engine which has a rotating nose bullet assembly, a rotating hollow tube which is effectively blanked off at the front end by the nose bullet assembly and is open at the rear end, an anti-icing system in which hot gas is caused to flow along the axis of the tube towards the nose bullet assembly to heat the nose bullet assembly and is cooled thereby, and the cooled air is caused to flow back along the tube towards the open end as a radially outer flow, and means for supplying hot gas to the open end of the tube, the improvement comprising flow inducing means located adjacent the open end of the tube, the flow inducing means having an inlet for receiving swirling inflowing hot gas, and flow directing means for redirecting the inflowing hot gas along the axis of the tube, the flow directing means comprising a plurality of stationary vanes which have a portion extending radially and a portion extending an axial direction towards the open end of the tube.

**4,941,318**

## AIR-FUEL RATIO FEEDBACK CONTROL SYSTEM HAVING SHORT-CIRCUIT DETECTION FOR AIR-FUEL RATIO SENSOR

**Hiroki Matsuoka, Susono, Japan, assignor to Toyota Jidosha Kabushiki Kaisha, Aichi, Japan**

**Filed Feb. 27, 1989, Ser. No. 316,031**
**Claims priority, application Japan, Mar. 1, 1988, 63-45910**
**Int. Cl.[5] F02D *41/22, 41/14***
**U.S. Cl. 60—274** **34 Claims**



1. A method for controlling an air-fuel ratio in an internal combustion engine having a catalyst converter for removing pollutants in the exhaust gas thereof, upstream-side and downstream-side air-fuel ratio sensors disposed upstream and downstream, respectively, of said catalyst converter, for detecting a concentration of a specific component in the exhaust gas, and a pull-up type input circuit for supplying a differential current to said downstream-side air-fuel ratio sensor and receiving an output of said downstream side air-fuel ratio sensor, comprising the steps of:

determining whether or not the output of said pull-up type input circuit is lower than a predetermined activation level;

determining that said downstream-side air-fuel ratio sensor is in an activated state after the output of said pull-up type input circuit is lower than said predetermined active level;

adjusting an actual air-fuel ratio in accordance with the outputs of said upstream-side and downstream-side air-fuel ratio sensors when said downstream-side air-fuel ratio sensor is in an activation state;

determining whether or not said downstream-side air-fuel ratio sensor is short-circuited; and

prohibiting the adjustment of said actual air-fuel ratio by the output of said downstream-side air-fuel ratio sensor when said downstream-side air-fuel ratio sensor is short-circuited.

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**4,941,319**

## ENGINE CONTROL DEVICE

**Hitoshi Yamamoto; Takumi Tottori, and Masayuki Toriyama, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

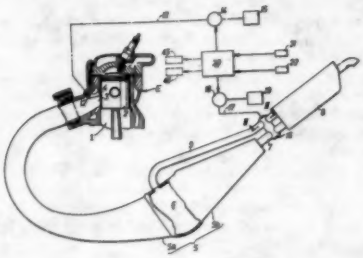
**Filed Sep. 29, 1988, Ser. No. 251,593**
**Claims priority, application Japan, Sep. 30, 1987, 62-247678; Oct. 5, 1987, 62-251107**
**Int. Cl.[5] F02B *27/02***
**U.S. Cl. 60—314** **16 Claims**

1. An engine control apparatus for controlling a two-cycle internal combustion engine having at least one cylinder with an exhaust port connected to an exhaust pipe comprising:

a pivotally mounted exhaust control valve disposed adjacent to the exhaust port, said exhaust valve reversably pivotable partially into the exhaust port to control engine exhaust timing;

a first servo motor mechanically linked to said exhaust valve for selectively pivoting said exhaust valve into a desired position in said exhaust port;

means for timing pressure pulses in the exhaust pipe comprising a frustro-conical reflector disposed within said exhaust pipe, said reflector having a larger end facing oncoming exhaust gas flow, and said reflector axially displaceable within the exhaust pipe;



a second servo motor mechanically linked to said reflector for selectively positioning said reflector within the exhaust pipe to adjust timing of exhaust pressure pulses; and

a controller connected to said first and second servo motors, said controller receiving at least engine speed and throttle opening information and controlling said first and second servo motors to position said exhaust valve and said reflector, respectively, to desired positions based at least in part on the engine speed and throttle opening information.

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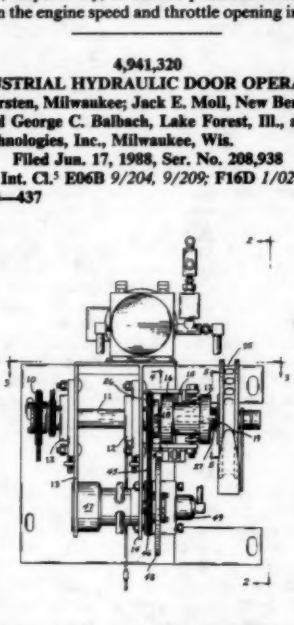
**4,941,320**

## INDUSTRIAL HYDRAULIC DOOR OPERATOR

**Otto E. Kersten, Milwaukee; Jack E. Moll, New Berlin, both of Wis., and George C. Balbach, Lake Forest, Ill., assignors to ASI Technologies, Inc., Milwaukee, Wis.**

**Filed Jun. 17, 1988, Ser. No. 208,938**
**Int. Cl.[5] E06B *9/204, 9/209*; F16D *1/02***
**U.S. Cl. 60—437** **5 Claims**



1. A door operator for opening and closing a door, comprising:

a drive shaft connectable to the door to move the door between open and closed positions;

a bi-directional hydraulic motor driven by a pump and connectable by a power train to the drive shaft;

an hydraulic brake connectable with the power train;

control means for controlling the direction and duration of

operation of the hydraulic motor and for engaging the brake whenever the motor is not provided with fluid under pressure from the pump;

a shiftable quill for connecting the power train to the drive shaft;

a manually operable wheel alternatively connectable to the drive shaft by the shiftable quill;

shift means for manually moving the shiftable quill between a position in which the power train is connected to the drive shaft and an alternate position in which the wheel is connected to the drive shaft, the shift means comprising a shifting fork that is engageable with the quill upon pulling of a cable connected to the fork, said fork being spring biased to a normal position out of engagement with the quill; and

a switch actuated by the cable to disable the control means whenever the cable is pulled.

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**4,941,321**

## DIRECTIONAL CONTROL WITH LOAD-SENSING PASSAGE CONTROLLED BY THROTTLING NON-RETURN VALVE HAVING ADJUSTABLE BIASING SPRING

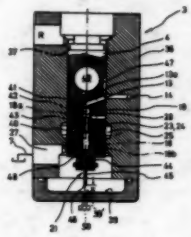
**Rudolf Brunner, Baldham b. Munich, Fed. Rep. of Germany, assignor to Heilmeier & Weinlein Fabrik Fur Oelhydraulik GmbH & Co.K, Fed. Rep. of Germany**

**Filed Mar. 6, 1989, Ser. No. 320,076**

**Claims priority, application Fed. Rep. of Germany, Mar. 8, 1988, 3807583**

**Int. Cl.[5] F15B *13/02***

**U.S. Cl. 60—468** **8 Claims**



1. A hydraulic control apparatus (1) comprising at least one directional control valve (3, 3*a*) which is arranged in front of a consumer (2, 2*a*) and whose control member (4, 4*a*) shuts off at least one consumer line (5, 5*a*, 5*b*) in a neutral position (0) and alternately connects same in two control position (a, b) to a pump line (6) fed from a source of pressure (P) or to a return line (7), a pressure compensation valve (8) which is connected to said pump line and which, for the purpose of returning the pressure medium that is not required by said consumer, includes a slide (10) which is spring-loaded towards the shut-off position, a control line circuit (S) which is connected to said pump line and which includes a first control line (12) leading from said pump line to a relief connection (11) connected in said neutral position to said return line, a second control line (14) connected to said first control line (12) for connecting the spring side of said slide (10) of said pressure compensation valve (8) to at least one load-pressure sensing connection (13) of said directional control valve (3, 3*a*) and a third control line (15) at another side of said slide (10) of said pressure compensation valve (8), said load-pressure sensing connection (13) being connected to said consumer line in at least one control position (a), a first throttle point (16) in said first control line (12) whose input pressure acts via said third control line (15) on said slide (10) against the spring load, and a second throttle point (17, 17*a*) provided between said load-pressure sensing connection and the connection point (12*a*) of said first and second control lines, whose input pressure can be raised during adjustment of said control member (4, 4*a*) from said neutral position (0) and transmitted to the spring side of said slide (10), said second throttle point (17) controlling the flow from said second control line (14) through said load-pressure sensing connection (13) to said consumer line (5) and there being at least one nonreturn valve (19) which includes a spring (18) operative in the closing direction and which opens in the direction of flow towards said consumer line (5), characterized in that said spring (18) is biased in proportion to a lift movement of said control member and in an infinitely variable manner at least over a portion of the lift path of said control member (4) from said neutral position (0) into the position connecting said pump line and said consumer line.

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**4,941,322**

## TANDEM MASTER CYLINDER WITH VALVED HYDRAULIC POWER BOOSTER FLUID PASSAGE IN PISTON

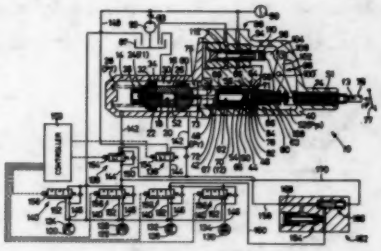
**Yoshihisa Nomura, and Noboru Noguchi, both of Toyota, Japan, assignors to Toyota Jidosha Kabushiki Kaisha, Japan**

**Filed Jun. 20, 1988, Ser. No. 208,585**

**Claims priority, application Japan, Jun. 25, 1987, 62-158157**

**Int. Cl.[5] B60T *13/14, 13/58, 8/44***

**U.S. Cl. 60—547.1** **21 Claims**



1. A hydraulically operated braking system wherein a presser piston, and an input piston operated by a brake operating mechanism are fluid tightly and slidably fitted in a housing such that said presser and input pistons cooperate with said housing to define a pressure chamber in front of said presser piston, and a power chamber between said presser and input pistons, said power chamber being supplied with a brake fluid which is delivered from an external hydraulic power source, through a control valve which is operated based on a relative movement between said presser and input pistons, whereby a power pressure in said power chamber is controlled, said pressure chamber being connected to at least one brake cylinder of a first braking arrangement, while said power chamber is connected to at least one brake cylinder of a second braking arrangement, wherein the improvement comprises:

an auxiliary piston fluid tightly and slidably fitted in said housing such that said power chamber is divided into a first chamber between said presser and auxiliary pistons, and a second chamber between said auxiliary and input pistons;

a connecting mechanism connecting said auxiliary and presser pistons such that said connecting mechanism permits said auxiliary piston to approach said presser piston, and such that said auxiliary and presser pistons are normally spaced apart from each other by a predetermined maximum distance;

said auxiliary piston having a communication passage formed therethrough for fluid communication between said first and second chambers;

a shut-off valve provided in said communication passage, and having a closed position in which said communication passage is closed in a first state of said auxiliary and input

pistons in which said auxiliary and input pistons are advanced as a unit in abutting contact with each other, and an open position in which said communication passage is open in a second state of said auxiliary and input pistons other than said first state;

check means disposed in parallel to said shut-off valve, and permitting a flow of the brake fluid in a first direction from said second chamber to said first chamber while inhibiting a flow of the brake fluid in a second direction opposite to said first direction;

said at least one brake cylinder of said second braking arrangement being connected to said first chamber, wherein said at least one brake cylinder of said first braking arrangement and said at least one brake cylinder of said second braking arrangement are activated by an operating force acting on said brake operating mechanism, which is imparted to said auxiliary piston through said input piston, when said power pressure is not obtained in said power chamber.

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**4,941,323**

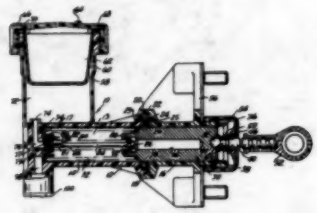
## HYDRAULIC CYLINDER PROVIDED WITH A SEAL-LESS PISTON

**Keith V. Leigh-Monstevens, Troy, Mich., assignor to Automotive Products plc, Warwickshire, England**

**Continuation of Ser. No. 112,047, Oct. 2, 1987, abandoned, which is a continuation of Ser. No. 830,272, Feb. 18, 1986, abandoned. This application Apr. 19, 1989, Ser. No. 339,966**

**Int. Cl.[5] B60T *11/236***

**U.S. Cl. 60—589** **6 Claims**



1. A hydraulic cylinder comprising:

(A) a rear elongated housing member formed as a molded plastic member and defining an elongated smooth cylindrical rear bore of a predetermined diameter and open at its front end;

(B) a front elongated housing member formed as a molded plastic member and closed at its front end by a front end wall and defining an elongated smooth front cylindrical bore of said predetermined diameter and open at its rear end;

(C) a piston having an elongated cylindrical main body portion defining a smooth uninterrupted cylindrical surface devoid of seal grooves and having substantially said predetermined diameter;

(D) coacting means operative to couple the rear end of said front housing member to the front end of said rear housing member with said bores coaxially aligned, the front of said rear bore juxtaposed to the rear of said front bore to define a smooth, continuous piston bore of said predetermined diameter slidably receiving said piston, and an annular groove defined between the rear end of said front bore and the front end of said rear bore and opening into said piston bore;

(E) an annular seal positioned in said groove with its inner periphery in sliding and sealing engagement with said smooth cylindrical surface of said piston main body portion;

(F) means defining an extreme rearwardly retracted position of said piston within said piston bore in which the front end of said piston cylindrical surface extends forwardly at least as far as said groove so that said seal maintains constant sealing engagement with said piston cylindrical surface irrespective of the reciprocal position of said piston in said piston bore;

(G) a pressure chamber in said piston bore forwardly of the front end of said piston;

(H) a rod extending through the rear end of said housing member for attachment to the rear end of said piston;

(I) a reservoir of fluid;

(J) a reservoir port in said front end wall of said front housing member opening in said pressure chamber;

(K) a fluid passageway interconnecting said reservoir and said reservoir port;

(L) a valving rod;

(M) means connecting said valving rod to the front end of said piston with said rod extending forwardly from said piston centrally within said pressure chamber;

(N) a valve head on the front end of said valving rod for valving coaction with said reservoir port; and

(O) a discharge port in said front housing proximate said front end of said front housing and opening in said pressure chamber independently of, and at a location spaced from, said reservoir port.

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**4,941,324**

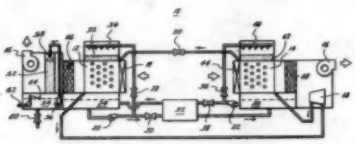
## HYBRID VAPOR-COMPRESSION/LIQUID DESICCANT AIR CONDITIONER

**John L. Peterson, 1203 W. Creek Loop, Round Rock, Tex. 78681, and John R. Howell, 3200 Kerby La., Austin, Tex. 78703**

**Filed Sep. 12, 1989, Ser. No. 405,624**

**Int. Cl.[5] F25B *17/00***

**U.S. Cl. 62—94** **13 Claims**



10. A hybrid air conditioning system comprising:

a refrigerant;

a liquid desiccant;

an evaporator for receiving liquid desiccant, refrigerant, and warm moist air, and for expelling liquid desiccant, refrigerant, and cool dry air;

an evaporator housing having a first and second opening defining a horizontal evaporator air flow path through said evaporator;

a first fan mechanism placed within said evaporator air flow path near said second opening for horizontally drawing warm moist air into the evaporator at said first opening and for horizontally drawing cool dry air from the evaporator at said second opening;

a first entrainment separator configured within said evaporator air flow path near said second opening, said first entrainment separator having means for separating liquid desiccant from air within said evaporator air flow path;

a humidifier configured within said evaporator air flow path between said first entrainment separator and said first fan mechanism, said humidifier having means for adding moisture to air within the horizontal evaporator air flow path;

a condenser for receiving liquid desiccant, refrigerant, and dry air, and for expelling liquid desiccant, refrigerant, and hot moist air;

a condenser housing having a first and second opening defin-

ing a horizontal condenser air flow path through said condenser;

a second fan mechanism placed within said condenser air flow path near said second opening for horizontally drawing dry air into the condenser at said first opening and for horizontally drawing hot moist air from the condenser at said second opening;

a second entrainment separator configured within said condenser air flow path near said condenser, said second entrainment separator having means for separating liquid desiccant from air within said condenser air flow path;

each of said evaporator and condenser having a heat and mass exchanger comprising:

(I) a plurality of horizontally extending refrigerant tubes extending the length of said condenser or evaporator through which refrigerant is circulated;

(II) a plurality of substantially planar fins extending the height of said condenser or evaporator, the planar surface of each fin being perpendicularly traversed by said plurality of refrigerant tubes;

(III) a horizontal air flow path extending perpendicular to said horizontally extending refrigerant tubes and along the planar surface of each said planar fin;

(IV) a distribution media configured above said refrigerant tubes and said fins for distributing said liquid desiccant vertically down and across the surface of said fins;

(V) a sump configured below said refrigerant tubes and said fins for receiving downward flowing liquid desiccant;

means for circulating said refrigerant within the horizontally extending refrigerant tubes and between said condenser and evaporator; and

means for pumping said liquid desiccant within said evaporator and within said condenser and between the sump of said evaporator and the sump of said condenser.

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**4,941,325**

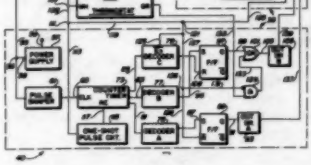
## ENERGY EFFICIENT ELECTRONIC CONTROL SYSTEM FOR AIR-CONDITIONING AND HEAT PUMP SYSTEMS

**Douglas J. Nuding, 1320 E. Crescent Cir., Mesa, Ariz. 85204**

**Filed Sep. 6, 1989, Ser. No. 402,850**

**Int. Cl.[5] F25D *17/00***

**U.S. Cl. 62—158** **20 Claims**



1. In conventional air-conditioning and heat pump systems normally including a compressor means, a compressor motor for operating said compressor means, a compressor contactor for turning said compressor motor on and off, an evaporator means, a conditioned air delivery blower fan, a blower fan motor for driving said blower fan, a blower relay for turning said blower fan motor on and off, a condenser means, a condenser fan, a condenser fan motor for driving said condenser fan, a condenser fan relay for turning said condenser fan motor on and off, a control transformer for converting sixty-cycle AC line voltage to control voltage AC power, an air duct system for delivering conditioned air and returning spent air from an area to be conditioned or controlled, a thermostat for automatic temperature control, and an improved energy efficient control system comprising:

first circuit means responsive to said thermostat indicating a need for conditioned air for initially energizing said condenser fan relay to turn on said condenser fan motor and drive said condenser fan for pre-cooling said condenser means and for preventing a high pressure or high stress compressor start-up;

second circuit means responsive to the elapse of a first predetermined period of time after the initiation of said pre-cooling of said condenser for energizing said compressor contactor to start said compressor motor for pre-cooling said evaporator, and a portion of the air in said duct system, for preventing a reverse temperature gain, for shortening the air production or "on" cycle time, and for providing protection for the compressor and the compressor motor;

third circuit means responsive to the elapse of second predetermined period of time after said first predetermined period of time for energizing said blower fan relay for driving said blower fan and supplying conditioned air to the area to be conditioned via said air duct system so as to initially deliver a built-up volume of conditioned air while providing additional protection for the blower fan and blower motor; and

fourth circuit means responsive to a third predetermined period of time after said first and second predetermined periods of time and after said condenser motor and said compressor motor cycles off in response to a signal from said thermostat indicating that the user-selected temperature has been attained, for maintaining said blower fan on until substantially all conditioned air remaining in said ductwork system and said evaporator has been delivered and for turning said blower fan motor off at the expiration of said third predetermined period of time.

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**4,941,326**

## AIR CONDITIONER HAVING OUTDOOR AIR INTRODUCING MECHANISM

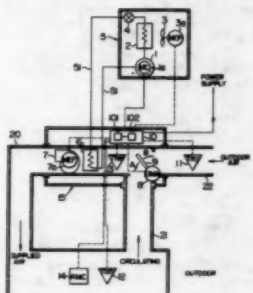
**Toyo Sumi; Motoshi Miyanaka, both of Shimizu; Keiji Sato, Shizuoka, and Yoshiki Hayata, Shimizu, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 21, 1988, Ser. No. 260,773**

**Claims priority, application Japan, Nov. 2, 1987, 62-278756**

**Int. Cl.[5] F25D *17/00***

**U.S. Cl. 62—180** **2 Claims**



1. An air conditioner comprising:

an outdoor unit having a compressor a condenser and an expansion valve;

an indoor unit having an evaporator, piping connected to deliver air to a room and to receive exhausted room air

and to receive outside air, and an indoor fan to control air delivery into a room;

duct means for receiving both outside air and exhausted room air thereby to provide mixed air;

a damper disposed in an air flow path to said indoor fan;

control apparatus having an input circuit connected to receive signals related to room air temperature, outside air temperature and mixed air temperature;

a memory circuit for storing a room temperature set point, a mixed air temperature initial set point, an outdoor-air-cooling-changeover outdoor air temperature set point, and a damper minimum opening set point; and

an arithmetic processing section and a control circuit for controlling the operation of opening or closing said damper by comparing the room temperature with a room temperature set point, the outdoor air temperature with an outdoor-air-cooling-changeover outdoor air temperature set point, and the mixed air temperature with a mixed air temperature initial set point, by using an altered mixed air temperature set point higher than the mixed air temperature set point if a state in which the room temperature is lower than the room temperature set point has continued for a certain period of time, and by using another altered set point obtained by reducing the mixed air temperature set point if a state in which the room temperature is higher than the room temperature set point has continued for a certain period of time.

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**4,941,327**

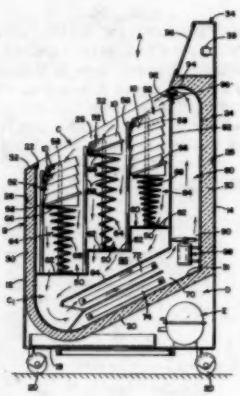
**COMPACT FOOD PACKAGE DISPLAY REFRIGERATOR**

**Milton C. Miles, Aurora, Ohio, assignor to FreshNes Foods Corporation, Solon, Ohio**

**Filed Jul. 24, 1989, Ser. No. 383,704**

**Int. Cl.[5] A47F *3/04***

**U.S. Cl. 62—246** **17 Claims**



1. A compact retail display refrigerator for displaying refrigerated, like form, food packages maintained at super chilled temperatures, said refrigerator comprising a small size cabinet having an open top, front and back walls, a pair of side walls, and a bottom wall, said cabinet being provided with an upper inner refrigeration compartment containing a plurality of vertically extending guideways arranged in an orthogonal row array for supporting a plurality of stacks of the food packages in spaced apart orthogonal relation therein for progressive upward step-by-step movement in the guideways, said guideways each comprised of a plurality of vertically extending spaced guide pins upstanding from a perforated base support plate spaced above the said bottom wall of the cabinet to define a lower refrigerated compartment portion therein including a bottom cooling chamber portion, self-acting spring loaded lift devices mounted within the respective said guideways for supporting the said stacks of food packages therein in rested position on said lift devices and continuously urging them upwardly in their respective said guideways to locate the existing topmost package in each stack at an exposed predetermined selection level at the open top of the cabinet, refrigerating mechanism including cooling coil means located within said bottom cooling chamber portion for providing chilled air at the said super chilled temperatures, and chilled air flow creating means including a vertical air duct located at the back of said cabinet and provided with a closed top end and an air circulating electric fan located within said cooling chamber adjacent the open bottom end of said air duct for forcing the said chilled air from said cooling chamber portion upwardly through said air duct to the top of the cabinet and directing a horizontally flattened stream of the chilled air forwardly across the tops of the said row array of package stacks and downwardly therebetween to maintain the individual packages at the said super chilled temperatures.

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**4,941,328**

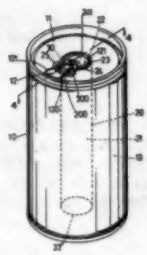
**METAL CAN ENDS WITH METAL PULL TABS BONDED THERETO**

**Lai-Fa Shen, No. 8, Alley 8, Lane 26, Sec. 3, Tay-Ho Rd., Changhua City, Taiwan**

**Filed Jul. 7, 1989, Ser. No. 376,677**

**Int. Cl.[5] F25D *3/10***

**U.S. Cl. 62—294** **3 Claims**



1. A metal can with two closed ends having a metal tube installed therein which contains a compressed cooling medium, said metal tube having a closed end and an open end sealed to one of said closed ends of the can, said one of said closed ends of said can being provided with a first score line defining a first area thereof which is to be detached from said can by tearing along said first score line to provide a common access, including a first access to an interior of said metal can and a second access to an interior of said metal tube, and a metal pull tab attached to an upper side of said first area, characterized in that said one of said closed ends of said can has a C-shaped score line formed within said first area thereof defining a second area which has a nondetachable portion bendably connected to said first area, said second area being adapted to be detached from said can by tearing along said C-shaped score line in a first direction from said first access to said second access so as to form an aperture above said open end of said metal tube, said pull tab being attached to an upper side of said second area away from said nondetachable portion, and a second score line formed on said metal tube defining an arcuate area adjacent said open end of said metal tube having a nondetachable portion perpendicularly connected to a lower side of said first area, said arcuate area of said metal tube being adapted to be torn away from said metal tube by tearing along said second score line with said nondetachable portion thereof attaching to said lower side of said first area so as to facilitate a detachment from said can of said first area in a second direc-

tion opposed to said first direction after said second area is pulled up.

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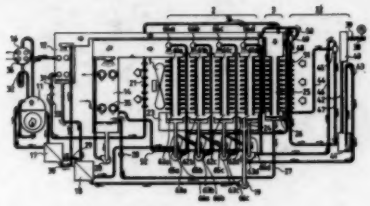
**4,941,329**

## DOUBLE EFFECT AIR-COOLED ABSORPTION REFRIGERATING MACHINE

**Kouji Imura, Shimoinayoshi; Tomihisa Ohuchi, Tsukuba; Kyoji Kohno; Tamio Shimizu, both of Shimoinayoshi, and Michihiko Aizawa, Ushiku, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 28, 1989, Ser. No. 316,941**
**Claims priority, application Japan, Mar. 4, 1988, 63-49522**
**Int. Cl.[5] F25B *15/00***
**U.S. Cl. 62—476** **9 Claims**



1. A double effect air-cooled absorption refrigerating machine utilizing a vacuum pressure as an operational pressure and having components comprising at least an evaporator, a vertical pipe type air-cooled absorber, a vertical pipe-type air-cooled condenser, a high-temperature regenerator, a low-temperature regenerator, a solution heat exchanger, pipings for connecting operatively these components and a plurality of fans for supplying cooling air to said air-cooled condenser, wherein

said plurality of fans are disposed on an upper wall face which, together with a lower wall face and side wall faces, constitute a hexahedron shaped outside frame of a machine body, said air-cooled absorber having an air-cooled heat exchanger which is disposed on two adjacent side wall faces, said air-cooled condenser having an air-cooled heat exchanger which is disposed on one side wall face of remaining side wall faces, and said evaporator, said high-temperature regenerator, said low-temperature regenerator, said solution heat exchanger and said pipings for connecting operatively these components are disposed respectively on an inner portion of the machine body so as to be surrounded by said air-cooled absorber and said air-cooled condenser.

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**4,941,330**

## MULTI-STAGE FLASH EVAPORATOR

**William R. Williamson, 8310 Pilgrim Rd., Pensacola, Fla. 32504**

**Division of Ser. No. 732,861, May 10, 1985, Pat. No. 4,731,164, which is a continuation-in-part of Ser. No. 617,760, Jun. 6, 1984, Pat. No. 4,548,257, which is a continuation of Ser. No. 350,804, Feb. 22, 1982, abandoned. This application Dec. 17, 1987, Ser. No. 134,318**
**Int. Cl.[5] F25B *39/02***
**U.S. Cl. 62—515** **4 Claims**

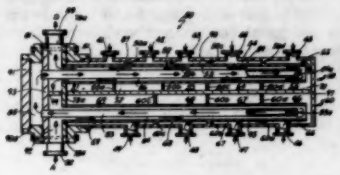
1. A FREON heat pump having a FREON condenser, said condenser including:

a. a substantially horizontal outer shell having an elongated center section, and having a first tube sheet closure a closed distal end;

b. at least one externally finned tubular sheath member having a closed end adjacent but spaced from said closed distal end of said shell and an open end facing said first tube sheet closure of said shell;

c. means for forming a first fluid flow zone between the outer surfaces of said finned sheath and said shell wherein said first fluid is condensed;

d. an insulating plastic bayonet tube concentrically positioned in at least one of said sheaths, said bayonet tube piercing said first tube sheet closure, and having an outer portion extending at least through said first tube sheet closure and an inner portion terminating in an open end space from said closed end of said sheath;



e. means for forming a second fluid flow zone wherein said second fluid is heated in turbulent flow, said second fluid flow zone including the annulus formed between said bayonet tube and the inner surface of said sheath;

f. means for directing said second fluid into said bayonet tube in the direction of said open end of said bayonet tube; and

g. means for removing said heated second fluid from said second fluid flow zone.

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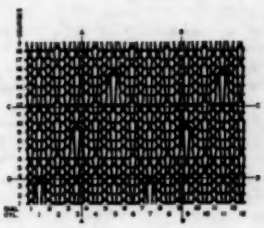
**4,941,331**

## METHOD OF PRODUCING DOUBLE KNIT FABRIC WITH HOLES THERETHROUGH AND KNITTED COLOR BANDS

**Andre Cournoyer, Ste Rosalie; Serge Berard, and Denis Cote, both of St-Hyacinthe, all of Canada, assignors to Sport Maska Inc., St-Hyacinthe, Canada**

**Continuation of Ser. No. 937,084, Dec. 2, 1986, abandoned. This application Feb. 17, 1989, Ser. No. 312,307**
**Claims priority, application Canada, Nov. 27, 1986, 523976**
**Int. Cl.[5] D04B *9/06***
**U.S. Cl. 66—25** **3 Claims**



1. The method of producing a double-knit fabric for use in a sports garment to allow control of body heat with respect to perspiration of the player wearing same, the fabric incorporating holes therethrough on a knitting machine equipped with dial and cylinder needles, comprising the steps of:

knitting a pattern in at least four consecutive courses in alternance one cylinder and one dial wave in a pattern of four wales of each,

a sequence of steps in a first cylinder wale comprises knitting a welt stitch in the first course, two consecutive tuck stitches in the second and third course to form a hole, and a knit stitch in the fourth course, concurrently knitting in an adjacent second cylinder wale, a knit stitch in the first course, and a welt stitch in the second, third, and fourth courses, concurrently knitting in an adjacent third cylinder wale, a welt stitch in the first, second, and third

courses, and a knit stitch in the fourth course, and concurrently knitting in an adjacent fourth cylinder wale, a knit stitch in the first course and a welt stitch in the second, third, and fourth courses,

concurrently knitting in a first dial wale a sequence of a welt stitch in the first course and a knit stitch in the second, third, and fourth courses, concurrently knitting in an adjacent second dial wale, a welt stitch in the first course, and a knit stitch in the second, third, and fourth courses, concurrently knitting in an adjacent third dial wale, a welt stitch in the first course and a knit stitch in the second, third, and fourth courses, and concurrently knitting in an adjacent fourth dial wale, a welt stitch in the first course, and a knit stitch in the second, third, and fourth courses, and

repeating said pattern to form a series of holes throughout the fabric in diagonal linear arrangement through the fabric.

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**4,941,332**

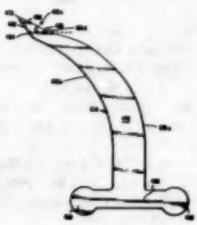
**CIRCULAR WEFT KNITTING MACHINE SINKER**

**E. C. Tibbals, Jr., Rt. 2, Box 386, High Point, N.C. 27260**

**Division of Ser. No. 810,361, Mar. 24, 1986, Pat. No. 4,811,572, which is a division of Ser. No. 398,303, Jul. 14, 1982, Pat. No. 4,608,839. This application Aug. 5, 1988, Ser. No. 228,956**

**Int. Cl.[5] D04B *15/06***

**U.S. Cl. 66—104** **4 Claims**



1. A sinker element for two dimensional displacement in a circular knitting machine comprising,

a curved planar body portion having a convex and a concave contoured defining marginal edge and terminating in a selectively shaped multilanded point means at one terminal end thereof and in a transversely disposed cross arm at the other terminal end thereof,

a cam butt disposed at each extending end of said cross arm,

said selectively shaped multilanded point means being formed by a first essentially straight marginal edge segment serving as a first land disposed above and at an obtuse angle relative to the end portion of the convex contoured marginal edge of said body portion which serves as a second land,

one end portion of said first land being disposed in overhanging spaced relation with at least a portion of said second land with an arcuate recess disposed intermediate said first and second lands.

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**4,941,333**

**CENTRIFUGALLY DRAINING SINGLE DRUM WASHING MACHINE**

**Hubert Blessing, Dallas, Tex., assignor to Levi Strauss & Co., San Francisco, Calif.**

**Filed Jan. 31, 1989, Ser. No. 304,968**

**Int. Cl.[5] D06F *23/02, 25/00, 37/06, 39/08***

**U.S. Cl. 68—19.2** **26 Claims**

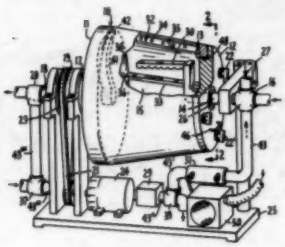
1. A washing machine comprising:

a drum including a frustum shaped, substantially liquid impermeable interior wall, a back end, and a front end opposite the back end, a perforated panel mounted inside the drum such that the perforated panel is substantially parallel to and spaced away from the back end, and a fluid tight door mounted in the drum for providing access to the interior of the drum;

means for supporting and rotating the drum about a horizontal axis of rotation passing substantially through the center of the back end and the center of the front end of the drum;

an outlet passing through the back end of the drum, the outlet being substantially aligned with the horizontal axis;

an inlet passing through the front end of the drum, the inlet being substantially aligned with the horizontal axis of rotation;



a liquid removing means attached to the outlet and located between the back end and the perforated panel; and

a plurality of ribs mounted inside the drum and axially extending substantially from the perforate panel to the front end, the washing machine having a wash cycle and a spin cycle, wherein the drum rotating means rotates the drum in one direction during the wash cycle such that when the drum contains water and garments the first side of the ribs will agitate the water and garments, and wherein the drum rotating means rotates the drum in an opposite direction during the spin cycle such that the garments and water will contact the second side of the ribs.

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**4,941,334**

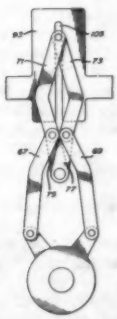
**DOOR LOCKING ARRANGEMENT**

**Aaron M. Fish, Hampstead, and Hariharan Somasundaram, Ville St. Laurent, both of Canada, assignors to Ilco Unican Inc., Montreal, Canada**

**Filed Jan. 31, 1989, Ser. No. 304,247**

**Int. Cl.[5] E05B *43/00***

**U.S. Cl. 70—214** **5 Claims**



1. A door locking arrangement including a permutation lock having a control shaft extending therefrom, and an actuating

means for effecting retraction of a latch member, and comprising:

a clutch system having a drive member, a latch actuating member and a permutation lock reset member, said latch actuating member and said permutation lock reset member being disposed on either side of said drive member;

said drive member being operatively connected to said actuating means to rotate therewith;

wherein, said drive member drives said latch actuating member, to retract said latch member, when a correct combination has been inserted in said permutation lock; and

said drive member drives said permutation lock reset member to reset said permutation lock, when either an incorrect combination, or no combination at all, has been inserted in said permutation lock;

link means operatively connecting both said latch actuating member and said permutation lock reset member to said control shaft;

whereby, said link means operatively connects said actuating means to said control shaft either through said drive member and said latch actuating member when the correct combination has been inserted into said permutation lock, or through said drive member and said permutation lock resetting member when an incorrect combination has been inserted in said permutation lock;

said link means being symmetrically disposed;

said link means comprising:

a first drive link pivotally connected, at one end thereof, to said permutation lock reset member;

a second drive link pivotally connected, at one end thereof, to said latch actuating member;

a first transfer link pivotally connected, at one end thereof, to the other end of said first drive link;

a second transfer link pivotally connected, at one end thereof, to the other end of said second drive link;

the other end of said first transfer link being pivotally connected to the other end of said second transfer link;

a dummy link pivotally connected, at one end thereof, to both said first drive link, at the other end thereof, and said first transfer link, at the one end thereof, the other end of said dummy link being pivotally mounted on said control shaft for pivoting thereabout;

a control shaft link pivotally connected, at one end thereof, to said second drive link at the other end thereof, and said second transfer link, at the one end thereof, the other end of said control shaft link being fixedly coupled to said control shaft such that said control shaft link will pivot with rotation of said control shaft.

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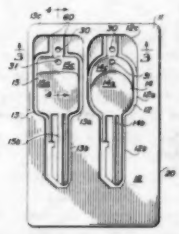
**4,941,335**

## COMBINATION KEY AND KEY HOLDER

**Bobby H. Allen, Louisville, Ky., assignor to Mitsubishi Corporation, Tokyo, Japan**

**Filed May 3, 1988, Ser. No. 189,954**
**Int. Cl.[5] A47G *29/10***
**U.S. Cl. 70—458** **13 Claims**



1. A molded plastic key and carrier combination comprising a card-like molded plastic carrier having top and bottom spaced apart surfaces, said carrier having a generally key-shaped recess therein, a molded plastic key blank adapted to be received in said recess, said recess having a portion thereof formed with a planar top surface substantially parallel to the carrier top surface opposed to a planar surface portion of said key and said planar surface portions provided with complementary snap connector means allowing said key to be snapped to said card and to be removed therefrom at least one of the connector means projecting outwardly from one of said planar surface portions.

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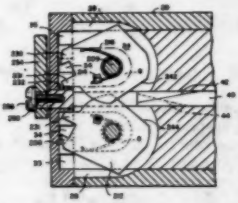
**4,941,336**

## LOCK MECHANISM

**Edward T. Steckler, 124 Hershey Mill Rd., Apt. A-1, Mountville, Pa. 17554**

**Filed Mar. 9, 1988, Ser. No. 166,008**
**Int. Cl.[5] E05B *29/02***
**U.S. Cl. 70—365** **9 Claims**



1. A lock mechanism comprising

a. a hollow cylindrical housing having an outer surface, an inner surface and at least one longitudinal groove cut into its inner surface,

b. a face plate having a key hole therein and attached to one end of the housing,

c. a cylinder having a longitudinal keyway and inserted into the housing, so that the keyway is aligned with the key hole,

d. an endpiece having a face and attached at its face to the housing opposite the face plate and having at least one circumferential groove and at least one radial groove cut in its face,

e. four tumblers

(i) pivotably mounted at approximately 90° intervals to the cylinder on an axis transverse the cylinder,

(ii) having a locking edge sized and positioned so as to extend into the longitudinal groove in the housing when the tumbler is in a locked position, and to be within the cylinder when the tumbler is in an unlocked position,

(iii) having at least one tab sized and positioned so as to fit within a radial groove of the endpiece when the tumbler is in a locked position and to align with and be capable of traveling through a circumferential groove in the endpiece when the tumbler is in an unlocked position, and

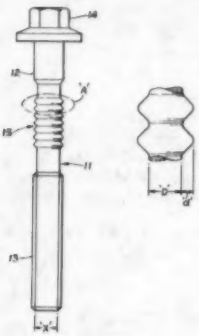
(iv) having a keying edge which has a given slope relative to a center line through the keyway and which extends into the keyway, said tumblers being sized and positioned to be able to pivot from a locked position to an unlocked position; and

f. a resilient means attached to the tumbler to bias the tumbler toward a locked position.

## 4,941,337
## METHOD OF MAKING THREADED FASTENERS

Ralph S. Emery, Bridgnorth, Great Britain, assignor to Austin Rover Group Limited, United Kingdom

Filed Jun. 30, 1989, Ser. No. 375,145
Claims priority, application United Kingdom, Jul. 11, 1988, 8816444
Int. Cl.[5] B21H 3/02; B21K 1/46, 1/56
U.S. Cl. 72—88 7 Claims



1. A method of making a threaded fastener including the steps of:

drawing from a material of suitable material properties a wire of appropriate diameter;

testing at least a length of the so formed wire to determine the tensile strength thereof;

cutting the wire into blanks of appropriate length according to the desired length of threaded fastener being made;

forming an appropriate external thread form on a portion of each of said blanks; and

forming at least one substantially circumferential groove in a shank portion of each of the blanks the depth of which groove is dependent upon the tensile strength of the length of wire tested and is such that the effective stress area thereby produced is lens than the minimum effective stress area of the external thread form and is such that the yield of the threaded fastener occurs in use in the region of the or each groove at a predetermined applied load.

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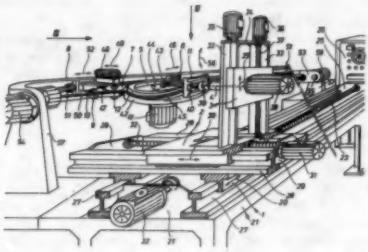
## 4,941,338
## DEVICE FOR COLD FORMING OF FERROUS AND NON-FERROUS METAL SECTIONS

Walter Spith, Radolfzell, Fed. Rep. of Germany, assignor to Spath GmbH & Co. KG, Steisslingen, Fed. Rep. of Germany

PCT No. PCT/EP87/00284, § 371 Date Mar. 18, 1988, § 102(e) Date Mar. 18, 1988, PCT Pub. No. WO87/07537, PCT Pub. Date Dec. 17, 1987
PCT Filed Jun. 2, 1987, Ser. No. 180,865
Claims priority, application Fed. Rep. of Germany, Jun. 4, 1986, 3618701
Int. Cl.[5] B21D 7/04
U.S. Cl. 72—151 13 Claims

1. In a device for cold forming a metal section having a bend line from an initially essentially straight metal section having a first end, a region to be formed, and a second end, by first pretensioning the metal section and then bending the thus pretensioned metal section, the improvement comprising:

a machine frame; a first clamp attached to the machine frame, adapted to clamp the first end of the metal section; a table; a form block mounted to the table, where the form block has an external perimeter which basically matches the bend line of the formed metal section; a second clamp attached to the table and adapted to clamp the second end of the metal section; means for mounting and controlling movement of said form block and said table along three spatially related axis (X, Y, and Z); at least one back-lash free die roller adjustably mounted, in the region to be formed, opposite the form block for controlled radial



movement relative to the table for pressing the region to be formed against the form block; and means for controlling the radial movement of the die roller in controlled synchronization with the controlled three dimensional movement of said form block.

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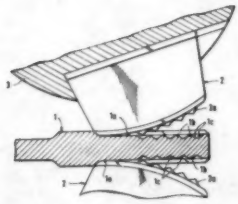
## 4,941,339
## TOOL BITS AND METHOD OF SHAPING

Dieter Soehnlein, Kaufering; Dieter Wirths; Anton Knoller, both of Landsberg am Lech, and Peter Kunert, Kaufering, all of Fed. Rep. of Germany, assignors to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein

Filed May 23, 1989, Ser. No. 355,566
Claims priority, application Fed. Rep. of Germany, May 25, 1988, 3817680
Int. Cl.[5] B21K 5/10
U.S. Cl. 72—189 6 Claims



1. A method of shaping grooves in an axially extending insertion end of a tool having an outside surface, such as a drill bit or a chisel bit, the insertion end to be inserted into a drive unit and having a free end surface, comprising the steps of forming the grooves inwardly of the outside surface by moving a grooving tool, relative to the insertion end, in contact with and in the axial direction of the insertion end with the groove having a base spaced inwardly of the outside surface, rolling a plurality of spaced grooves simultaneously, and in the step of forming the grooves, shaping the base of the grooves and forming stop faces extending transversely of the axial direction of the insertion end and being effective as stop faces in the axial direction of the insertion end with adjoining stop faces extending angularly relative to one another and to the axis of the insertion end.

**4,941,340**

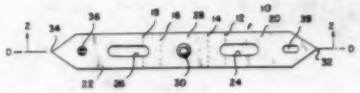
## METHOD OF FABRICATING WALL FASTENERS

**Thomas E. Nowak, Elk Grove Village; Edward J. Smith, Arlington Heights, both of Ill., and Eustathios Vassiliou, 12 S. Townview La., Newark, Del. 19711, assignors to E. Vassiliou, Newark, Del.**

**Continuation of Ser. No. 281,445, Dec. 8, 1988, abandoned, which is a division of Ser. No. 85,154, Aug. 14, 1987, Pat. No. 4,874,277, which is a continuation-in-part of Ser. No. 1,756, Jan. 9, 1987, Pat. No. 4,765,788. This application Jan. 4, 1990, Ser. No. 436,137**

**Int. Cl.[5] B21G *3/26***

**U.S. Cl. 72—379.2** **3 Claims**



1. A method for producing a wall fastener of the type comprising a thin, sheet metal anchor having a substantially flat head head portion and a hole therethrough, said hole having an axis extending through and contained in the plane of a substantially flat neck adjacent the head, the neck including an elongated opening therethrough extending in the plane of the neck the full length along the axis, first and second thin, flat sheet metal spreadable anchoring blades extending from the neck in the direction of the axis, co-planar with the neck, each having an inner and an outer surface, the inner surface of the first blade adjacent to the inner surface of the second blade, at least one of said blades terminating in a point, the method comprising the steps of:

shaping, cutting, folding and heat treating to harden a thin malleable sheet of metal, the improvement wherein comprises

forming distinct complementary, disengageable engaging means on each of said first and second blades, the engaging means comprising complementary engaging surfaces on each of said engaging means in a plane substantially perpendicular to the plane of the blade, and, to present separation of the blades during the heat treating step,

engaging said complementary engaging means prior to the heat treating step with a force sufficient to hold said blades with their inner surfaces adjacent to each other during the heat treatment and hardening steps, but insufficient to prevent the spreading of the blades upon insertion of a fastener thereinbetween.

**4,941,341**

## PROCESS AND APPARATUS FOR COLD PRESSING A CONICAL EXTERNAL THREAD

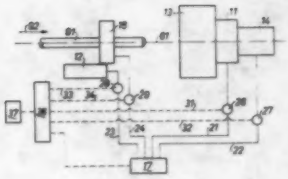
**Urs Kellner, Hüttenackerstrasse 10, CH-8712 Stäfa, Switzerland**

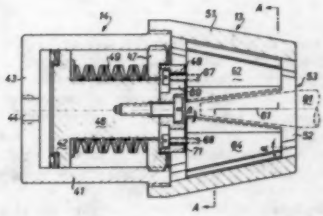
**Filed Jan. 23, 1989, Ser. No. 300,489**

**Claims priority, application Canada, Aug. 26, 1988, 3190/88**

**Int. Cl.[5] B21K *1/56***

**U.S. Cl. 72—402** **16 Claims**





5. Apparatus for cold pressing a conical external thread on the end of a cylindrical workpiece through multiple pressing steps comprising:

(a) a press tool having a guide sleeve defining a conical inner space having a longitudinal axis,

(b) a plurality of dies, having radially inner surfaces with lateral edges, displaceably mounted along generating lines of said inner space,

(c) a pressure plate fastened to said dies and movable in the longitudinal direction of the inner space, said dies fastened to said pressure plate in a manner allowing radial movement of said dies and said radial movement bounded by said guide sleeve and said dies lateral edges;

(d) holding means for holding a workpiece in said longitudinal axis of said conical inner space of said guide sleeve;

(e) feed means, for displacing said holding means and the press tool relative to one another along said longitudinal axis of said conical inner space through at least one presettable distance;

(f) rotating means for rotating said press tool about said longitudinal axis of said conical inner space through a presettable angle, and

(g) control means for causing said feed means to move said workpiece into said conical inner space while said dies are radially displaced, causing said dies to move radially inward until said lateral edges meet whereby said workpiece is pressed, causing said dies to be retracted from said workpiece, causing said rotating means to rotate said press tool through said presettable angle and causing said dies to again press said workpiece whereby any burr resulting from the previous pressing is pressed.

4,941,342

## MULTI-RAM FORGING ASSEMBLY

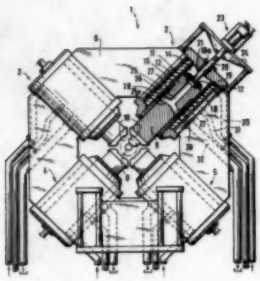
Otto Herndl, Leverkusen, and Werner Schiller, Bergisch-Gladbach, both of Fed. Rep. of Germany, assignors to Eumuco Aktiengesellschaft fur Maschinenbau, Fed. Rep. of Germany

Filed Jan. 31, 1989, Ser. No. 304,276

Claims priority, application Fed. Rep. of Germany, Feb. 6, 1988, 3803632

Int. Cl.[5] B21J *9/12*

U.S. Cl. 72—402 11 Claims



1. In a multi-ram forging assembly having a piston-cylinder unit for driving each ram carrying a forging tool wherein at least two diametrically opposed forging tools simultaneously act on a workpiece, each piston-cylinder unit comprising:

(a) a pressurized inlet chamber for containing a hydraulic pressure fluid at a predetermined pressure behind piston means movably disposed in a cylinder, said piston means including a front-end ram means for carrying a forging tool,

(b) valve means disposed on the piston means at a rear side opposite to the front-end ram means,

(c) said valve means including valve seat means and valve cone means having a closed position and an open position,

(d) actuator means connected to move the valve cone means between said closed and open positions,

(e) the piston means including a passage bore extending from the valve seat means to a pressure fluid discharge means located in the cylinder,

(f) pressure fluid inlet means for maintaining the predetermined pressure in the pressure fluid medium within the inlet chamber in advance of the valve seat means,

(g) means for connecting said pressure fluid discharge means to a hydraulic pressure fluid reservoir container providing a pressureless discharge of the pressure fluid, and

(h) a piston return pressure chamber within the cylinder to cause the return of the piston means under the action of a pressure fluid having a selected predetermined pressure maintained within said piston return pressure chamber.

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4,941,343

## METHOD AND APPARATUS FOR STRAIGHTENING VEHICLE BODIES AND FRAMES

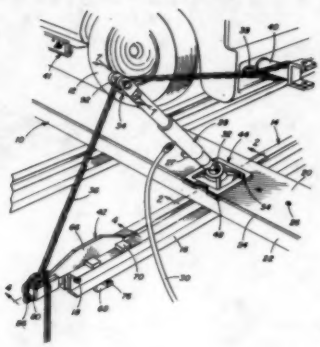
Joe L. Stancato, 2051 Wales Ave., N.W., Massillon, Ohio 44646

Filed Apr. 30, 1984, Ser. No. 605,217

Int. Cl.[5] B21D *1/12*

U.S. Cl. 72—447 16 Claims

1. In a vehicle frame straightening apparatus utilizing a hydraulic ram and a flexible chain connected to a vehicle component to be straightened, that improvement comprising a base plate having means on the upper surface thereof for connection with the lower end of a hydraulic ram in order to support the ram in upwardly extending position, said base plate including a substantially planar lower surface adapted to be supported on a horizontally disposed supporting surface and transfer the reaction force from the ram to the supporting surface and means spaced from the means connecting the ram and base plate for precluding upward movement of the base plate in relation to the supporting surface by engagement with a downwardly facing surface on the supporting surface thereby securely retaining the base plate on the supporting surface while enabling adjustment of the base plate in relation to the supporting surface and orientation of the base plate in different positions in relation to the supporting surface, said



means retaining the base plate on the supporting surface including a downwardly and inwardly extending reversely curved edge on one edge portion of the base plate to provide a hook-shaped structure to engage over an edge of a supporting runway to enable assembly and disassembly of the base plate and adjustment of the base plate along the edge of the supporting runway with lateral movement being precluded by the reversely curved edge.

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4,941,344

## DIE SETS

Brian J. Beech, West Midlands, and Edwin T. Beech, Tamworth, both of England, assignors to Sildean Limited, Birmingham, England

Filed Nov. 7, 1988, Ser. No. 268,152

Claims priority, application United Kingdom, Nov. 7, 1987, 8726155

Int. Cl.[5] B21D *37/10*

U.S. Cl. 72—456 8 Claims

1. In a die set, having a first plate and a second plate, a pillar and bush device comprising:

(a) a bush releasably secured in said first plate by first connector means,

(b) a pillar releasably secured in said second plate by second connector means and co-axial with and slidable in said bush,

(c) said bush including a first collar clamped to said first plate by said first connector means,

(d) said pillar including a second collar clamped to said second plate by said second connector means,

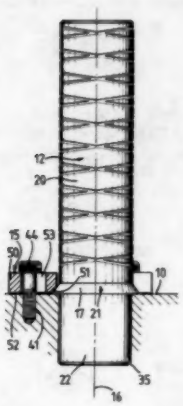
(e) at least one of said collars provides an abutment surface,

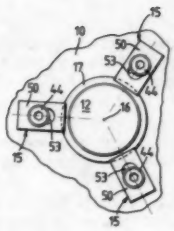
(f) said first connector means is releasably clamped to said first plate by first fastener means and said second connector means is releasably clamped to said second plate by second fastener means, and

(g) at least one of said connector means including a clamping surface which is engaged in cam engagement with said abutment surface at an angle inclined to said axis to transmit part of an axially directed force applied to said abutment surface during separation of said plates as a force acting radially outwards upon said clamping surface,

(h) a second one of said connector means including a plurality of threaded fasteners and an annular collar around the pillar or bush,

(i) said collar having keyhole shaped sockets therein dimensioned so that the heads of the fasteners can pass through the larger diameter parts of the sockets but not through the narrower parts of the sockets, so that, when the fasteners are engaged in a plate of the die set, the collar may be moved arcuately between a position in which it is removable from the plate and a position in which it is constrained by the heads.



**4,941,345**

## METHOD AND APPARATUS FOR THE MEASUREMENT OF GAS PROPERTIES

**Detlef Altemark, Dorsten; Robert Hess, Essen, and Karl H. Hillringhaus, Bottrop, all of Fed. Rep. of Germany, assignors to Ruhrgas Aktiengesellschaft, Essen, Fed. Rep. of Germany**

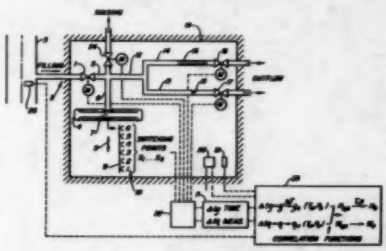
**PCT No. PCT/EP87/00377, § 371 Date Mar. 14, 1988, § 102(e) Date Mar. 14, 1988, PCT Pub. No. WO88/00693, PCT Pub. Date Jan. 28, 1988**

**PCT Filed Jul. 13, 1987, Ser. No. 188,395**

**Claims priority, application Fed. Rep. of Germany, Jul. 14, 1986, 3623664**

**Int. Cl.[5] G01N *9/32***

**U.S. Cl. 73—23.2** **14 Claims**



1. A method for measuring a gas property, the method comprising the steps of:

providing a gas holding chamber having a volume that varies in response to pressure differences between the interior of the chamber and the ambient atmosphere;

determining the correspondence between variations in the volume of the gas holding chamber and pressure differences between the interior of the chamber and the ambient atmosphere;

supplying gas to the chamber, whereby the pressure difference between the interior of the chamber and the ambient atmosphere is increased and the volume of the chamber is increased;

interrupting the gas supply to the chamber;

permitting the gas in the chamber to discharge across at least one flow restrictor, whereby the pressure difference between the interior of the chamber and the ambient atmosphere is decreased and the volume of the chamber is decreased;

measuring the period of time taken for the volume of the chamber to decrease from a first predetermined volume representative of a first pressure difference to a second predetermined volume representative of a second pressure difference; and

determining a resulting volume rate of flow and a gas property from the measured time period and from the decrease in volume.

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**4,941,346**

## VIBRATION-TYPE RHEOMETER APPARATUS

**Osamu Suzuki; Syousuke Ishiwata; Mitsuroh Hayashi, and Hideaki Oshima, all of Saitama, Japan, assignors to Chichibu Cement Kabushiki Kaisha, Japan**

**Filed Nov. 18, 1988, Ser. No. 273,273**

**Claims priority, application Japan, Nov. 18, 1987, 62-289521**

**Int. Cl.[5] G01N *11/10***

**U.S. Cl. 73—54** **17 Claims**

1. A vibration-type rheometer apparatus for measuring the behavior of a fluid sample with respect to an external force which changes with time, the apparatus comprising:

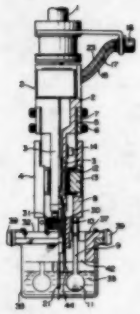
a support block firmly secured to a base frame, said support block having a support column at the lower part thereof;

tuning fork vibrator means including a pair of vibrator subas-

semblies secured to said secured block, extending downwardly from said support block and being arranged on opposite sides of said support column, said vibrator subassemblies each having at a free end thereof a thin and flat sensor plate to be placed into a fluid sample to be measured, both said sensor plates being distributed in the same imaginary vertical plane;

driving means for vibrationally driving said pair of vibrator subassemblies in opposite phase relation to each other and at the same driving frequency;

detecting means for detecting the amplitude of vibration of



at least one of said vibrator subassemblies which changes by the viscous resistance received by said sensor plates placed in the fluid sample and for outputting an electric signal representative of the amplitude of vibration;

control means for supplying a driving current having a magnitude which changes with respect to time to said driving means to thereby change a vibration-applying force applied to said pair of vibrator subassemblies; and

recording means for plotting, with respect to the change in magnitude of said driving current, the electric signal output from said detecting means which changes in response to changes in the driving current.

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**4,941,347**

**TURNTABLE-USING TESTING APPARATUS**

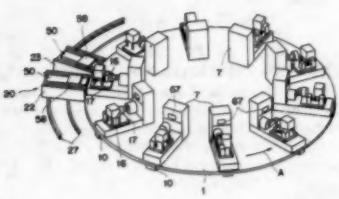
**Takashi Iijima, Iruma; Takeshi Matsui, Fujimi; Shigeru Kaneto, Osaka; Kenji Horio, Sakai, and Toshihiko Kato, Hawata, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha and Daifuku Co., Ltd., both of, Japan**

**Filed Jul. 18, 1989, Ser. No. 381,752**

**Claims priority, application Japan, Aug. 25, 1988, 63-212274; Aug. 25, 1988, 63-212275**

**Int. Cl.[5] G01M *15/00***

**U.S. Cl. 73—116** **8 Claims**



1. A turntable-using testing apparatus comprising:

a turntable,

testing units disposed at a plurality of circumferential locations on the turntable and individually having computers,

table-side connectors disposed at a plurality of locations in a peripheral edge portion of the turntable and individually connected to said computers,

a transfer device provided outside the turntable for transferring an object to be tested onto one of the testing units and removing the object from the testing unit,

a host computer spaced apart from the turntable, and

a ground-side connector connectable to and disconnectable from the table-side connectors and connected to the host computer.

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**4,941,348**

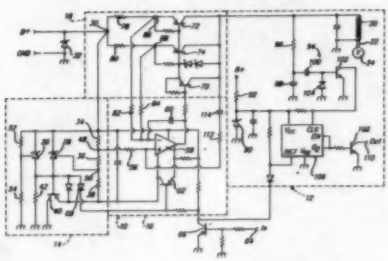
**ELECTROMOTIVE SENSOR**

**Darryl A. Hock, Harper Woods, Mich., assignor to Jabil Circuit Company, Madison Heights, Mich.**

**Filed Mar. 28, 1989, Ser. No. 329,772**

**Int. Cl.[5] G01M *19/00***

**U.S. Cl. 73—119 A** **2 Claims**



1. A circuit for sensing abrupt change in movement of an electromotively-driven part in an electrically-powered device, comprising:

a constant current source for supplying a substantially constant current to said device;

a means for monitoring a property indicative of the voltage across said device and for providing a corresponding voltage signal;

differentiator means receptive of said voltage signal for determining the time rate of change of said voltage signal;

detector means coupled to said differentiator for detecting change in the algebric sign of said time rate of change of said voltage signal, said algebraic sign being indicative of abrupt change in movement of said electromotively-driven part.

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**4,941,349**

**COAXIAL COILED-TUBING CABLE HEAD**

**Arnold M. Walkow, Houston, Tex.; William S. Kennedy, Groveland, and Kenneth J. Wolfe, Sunnyvale, both of Calif., assignors to Western Atlas International, Inc., Houston, Tex.**

**Filed Jun. 20, 1989, Ser. No. 368,766**

**Int. Cl.[5] E21B *47/00***

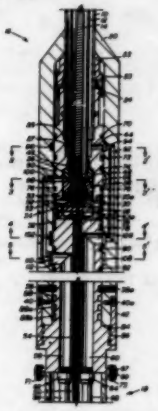
**U.S. Cl. 73—151** **6 Claims**

1. A cable head connector for coupling a plurality of nested coaxial fluid -conducting tubes to a downhole geophysical tool, each said tube being adapted to conduct a different fluid, comprising:

a plurality of means for separately gripping in turn, each one of the plurality of nested fluid-conducting tubes;

means, in fluid communication with the respective nested tubes, for fluidly bypassing, internally, a first means for

gripping and for fluidly bypassing, externally, a second means for gripping; and



means, in fluid communication with the fluid bypass means, for distributing separately, each of the respectively different fluids to the downhole geophysical tool.

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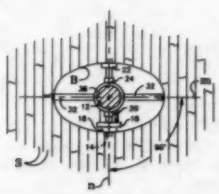
**4,941,350**

**METHOD AND APPARATUS FOR FORMATION TESTING**

**George F. Schneider, 237 Willow Valley Dr., Lancaster, Pa. 17602**

**Filed Apr. 10, 1989, Ser. No. 335,548**
**Int. Cl.[5] F21B *49/08***
**U.S. Cl. 73—155** **18 Claims**



17. A method for engaging a probe against a side of an oblong hole at the intersection with the short axis thereof, the borehole having relatively slippery sides, comprising the serial steps of:

inserting an elongate cylinder in the hole;

radially extending arms from the cylinder against the opposite sides of the hole causing the cylinder to rotate slidably within the hole until the arms closely align with the long axis of the hole; and

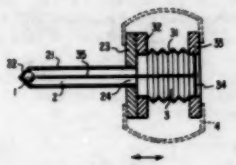
radially extending the probe from the cylinder in a plane at 90° from the arms against the sides of the hole.

**4,941,351**

**TRANSPORTER FOR A ROTOR OF A GAS FRICTION MANOMETER**

**Wolfgang Jitschin, Borgholzhausen, and Peter Röhl, Berlin, both of Fed. Rep. of Germany, assignors to Physikalisch-Technische Bundesanstalt, Braunschweig, Fed. Rep. of Germany**

**Filed May 11, 1988, Ser. No. 192,710**
**Claims priority, application Fed. Rep. of Germany, May 11, 1987, 3716016**
**Int. Cl.[5] G01D *11/24*; G01L *7/00***
**U.S. Cl. 73—431** **18 Claims**



18. A transporter for a rotor of a gas friction vacuum pressure meter comprising:

(a) a housing accommodating the rotor; said housing having a wall portion;

(b) an ambient surrounding the metallic rotor within the housing during transport; the ambient being non-reactive with the rotor;

(c) means, including said wall portion, for protecting the metallic rotor within the housing from physical and mechanical damage during transport; and

(d) retaining means for retaining the rotor in the wall portion; said retaining means comprising:

(1) a first flange including a rear wall of said retaining means;

(2) a second flange being connected gastight to the housing flange and being spaced from said first flange;

(3) a flexible bellows connecting the first and second flanges gastight; and

(4) a rod fastened to the rear wall and projecting from the rear wall between the first and second flanges, the housing flange and the bellows, into the housing and pressing against the rotor to retain the rotor against the wall portion.

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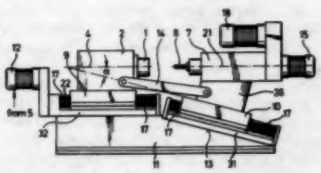
**4,941,352**

**METHOD AND APPARATUS FOR MASS CENTERING OF A ROTOR**

**Günter Fletzke, Forest, Va., assignor to Gebr. Hofmann GmbH & Co. KG Maschinenfabrik, Pfungstadt, Fed. Rep. of Germany**

**Filed May 5, 1989, Ser. No. 347,565**
**Int. Cl.[5] G01M *1/26***
**U.S. Cl. 73—461** **20 Claims**



1. Apparatus for mass centering of a rotor including: an unbalance measuring means for measuring the unbalance of the rotor, comprising a rotary spindle for carrying the rotor and means for rotating the spindle about an axis of rotation in the

unbalance measuring operation; an evaluation means operatively connected to the unbalance measuring means for ascertaining from the result of the unbalance measuring operation and the weight of the rotor the position of the axis of inertia thereof which extends through the center of mass of the rotor, with respect to said axis of rotation; a marking means comprising a marking tool for marking the position of the axis of inertia of the rotor on an end face thereof; and an adjusting mean for producing a relative displacement between the rotor and the marking tool in a radial direction with respect to the axis of rotation and parallel to the axis of rotation, the adjusting means including guide means for guiding one of said rotor and said marking means in said relative displacement, being disposed at an inclined angle with respect to the axis of rotation, whereby said relative displacement determines on said end face of the rotor a linear region of action of the marking tool which extends through said axis of rotation, such that the point on the end face of the rotor at which the measured axis of inertia passes therethrough can he turned into said region of action of said marking tool.

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**4,941,353**

## GAS RATE GYRO

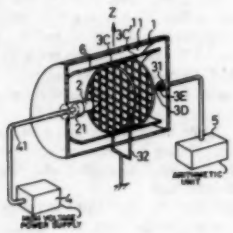
**Yoshiaki Fukatsu, Nagoya; Etsuji Nomura, Ichinomiya, and Kazuma Matsui, Toyohashi, all of Japan, assignors to Nippondenso Co., Ltd., Kariya, Japan**

**Filed Jan. 12, 1989, Ser. No. 296,191**

**Claims priority, application Japan, Mar. 1, 1988, 63-48445**

**Int. Cl.[5] G01P *9/00***

**U.S. Cl. 73—505** **8 Claims**



1. A gas rate gyro mounted on a mobile object to detect the rotatory motion of the mobile object through the measurement of the deflection of a gas flow varying as a function of the rotatory motion of the mobile object comprising:

a hermetic casing carried on the mobile object and hermetically containing a gas substantially of neutral molecules;

a first electrode comprising a needle electrode and disposed at one end of the hermetic casing;

a second electrode comprising a pair of grid electrodes disposed adjacently and electrically connected so the grid electrodes are at the same potential, and disposed within the casing at a predetermined distance from an opposite to the first electrode;

a high-voltage power supply which applies voltage across the first and second electrodes to produce a corona discharge around the first electrode so that an ionic wind composed of a mixture of the neutral molecules of the gas and ions produced by ionizing the neutral molecules flows from the first electrode toward the second electrode;

a detecting electrode comprising a pair of split electrodes for giving electrons to the ions contained in the ionic wind, disposed at a position within the casing at a predetermined distance from the first electrode where the ions produced by a corona discharge are not annihilated; and

a detecting circuit, connected to said pair of split electrodes, which detects the intensity of difference between the ionic currents flowing respectively through the split electrodes to detect a rotatory motion of the mobile object through the measurement of the deflection of the ionic wind resulting from the rotatory motion of the mobile object.

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**4,941,354**

## TRI-AXIAL ACCELEROMETERS

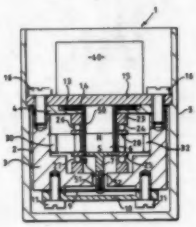
**Michael K. Russell, Lynworth House, 54 High Street, Prestbury, Cheltenham, England, and Anthony W. Russell, Drachlaw, Turriff, Aberdeenshire, Scotland**

**Filed Dec. 5, 1988, Ser. No. 279,936**

**Claims priority, application United Kingdom, Dec. 4, 1987, 8728442**

**Int. Cl.[5] G01P *15/13***

**U.S. Cl. 73—517 B** **7 Claims**



1. A tri-axial moving magnet accelerometer comprising a housing, a magnet mounted within the housing so as to be displaceable with respect to three mutually transverse measurement axes in response to an applied force, said magnet being mounted on a support member which is coupled to the housing by a planar diaphragm so as to allow for pivoting of said support member in the directions of two of said measurement axes by flexing of said diaphragm and so as to permit linear displacement of said support member in the direction of the third of said measurement axes by deformation of said diaphragm perpendicularly to the plane of said diaphragm, and sensing means for sensing displacement of said magnet and for providing a respective output signal proportional to the component of the applied force along each of said three measurement axes.

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**4,941,355**

## METHOD AND APPARATUS FOR THE MEASUREMENT OF ACCELERATIONS

**Hans Richert, Wilhelm-Dresing-Strasse 37, 4600 Dortmund 50, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 88,976, Aug. 21, 1987, abandoned, which is a continuation of Ser. No. 893,187, Aug. 5, 1986, abandoned, which is a continuation of Ser. No. 683,569, , abandoned. This application Jul. 21, 1988, Ser. No. 222,274**

**Int. Cl.[5] G01P *15/08***

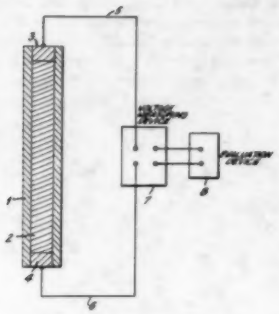
**U.S. Cl. 73—517 R** **6 Claims**

1. An apparatus for measuring accelerations, comprising:

a solid ion conductor to which an acceleration is applied along a longitudinal axis thereof, wherein a length of said ion conductor is at least a multiple of a cross-sectional extent thereof;

electrodes in contact with said ion conductor at opposite ends thereof;

a device connected to said electrodes for measuring and evaluating a voltage generated in said ion conductor; and



a mechanically tough frame for physically supporting the ion conductor.

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**4,941,356**

## PROCESS FOR DETECTING INSECTS

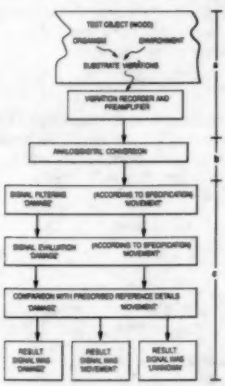
**Michael Pallaske, Kempen, Fed. Rep. of Germany, assignor to DESOWAG Materialschutz GmbH, Dusseldorf, Fed. Rep. of Germany**

**Filed Oct. 28, 1988, Ser. No. 263,763**

**Claims priority, application Fed. Rep. of Germany, Oct. 28, 1987, 3736515**

**Int. Cl.[5] G01N *29/04***

**U.S. Cl. 73—587** **7 Claims**




1. A process for the detection of insects in a solid substrate, comprising the steps of:

(a) measuring the substrate for vibration or noise caused by damage or movement of the insects in the substrate, the measurement being made free from interfering signals;

(b) obtaining specific signal properties for each vibration or noise behavioral reference pattern of the insects by digital signal computer processing;

(c) applying the reference pattern data to a microcomputer;

(d) obtaining data of on-going insect damage by recording substrate vibrations or noises, or both, and converting these vibrations or noises to digital form;

(e) comparing the movement and damage data to reference data; and

(f) developing from the comparison of step (e) an indication of either damage or movement, or the absence of either.

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**4,941,357**

## METHOD FOR ESTIMATING THE STRENGTH OF WOOD

**Gary S. Schajer, Federal Way, Wash., assignor to Weyerhaeuser Company, Tacoma, Wash.**

**Filed Dec. 23, 1988, Ser. No. 288,534**

**Int. Cl.[5] G01M *3/24***

**U.S. Cl. 73—600** **11 Claims**

1. A method for estimating the strength or stiffness of a piece of wood comprising:

measuring the longitudinal density profile of the piece of wood by detecting density at a plurality of longitudinally spaced local areas in the wood,

identifying and quantifying the features in the wood density profile indicative of the inherent wood strength and the wood structural effects spaced along the length of the wood, and

using the information derived from the measured wood density profile to estimate the wood strength or stiffness.

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**4,941,358**

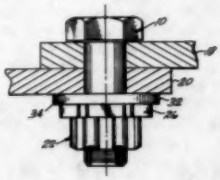
## PROCESS FOR PROOFING A THREADED JOINT

**George S. Wing, 531 Esplanade, Apt. 515, Redondo Beach, Calif. 90277**

**Filed Feb. 24, 1989, Ser. No. 315,472**

**Int. Cl.[5] F16B *31/02***

**U.S. Cl. 73—761** **6 Claims**



1. A process for proofing a threaded joint of work, an externally threaded fastener bearing on one side of the work, and an internally threaded fastener threaded onto the externally threaded fastener and bearing on the other side of the work, the two fasteners applying a clamp-up load to the work, the process comprising:

(a) engaging the externally threaded fastener and the work, with the external thread of the fastener extending from the work after such engagement;

(b) placing a wrenching washer over the externally threaded fastener in the path of the clamp-up load;

(c) engaging the thread of the internally threaded fastener with the external thread;

(d) tightening the internally threaded fastener on the exter-

nal thread to attempt to apply a desired value of the clamp-up load on the work through the washer and form a joint; and

(e) applying a proofing torque through the wrenching surface of the wrenching washer to determine whether it resists the application of a predetermined proofing torque before turning,

whereby, the joint is proofed and has the desired value of clamp-up load if the wrenching washer resists the predetermined proofing torque without turning.

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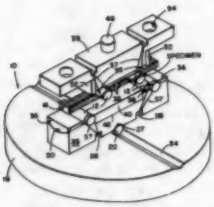
**4,941,359**

**ARTICULATING FLEXURE TEST FIXTURE**

**George D. Quinn, Watertown, and Raymond L. Goulet, Norwood, both of Mass., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Feb. 2, 1989, Ser. No. 306,005**
**Int. Cl.[5] G01N *3/20***
**U.S. Cl. 73—851** **5 Claims**



1. An articulating fixture for the three-point flexure testing of ceramics, comprising:

lower means for supporting the bottom of a specimen to be tested and arranged to provide line contact near the two ends of the specimen;

upper means for placing a load onto the top surface of a specimen, said upper means including one line of pressure and said bottom means including two lines of pressure so that there are three loading points in the fixture; and

each of said means including at least one articulated cooperating assembly which allows rotation in the direction of the contacting surface of the specimen whereby when the specimen is twisted, said fixture will adapt to the twist and still properly apply the load to the specimen;

the assembly for said lower means including a lower support cradle having an arcuate groove extending in the same direction as the specimen, and a swivel bearing support having a convex arcuate surface which mates with the surface of the groove so that the cradle and swivel bearing support are slidable with the swivel bearing support rotating within the groove to accommodate twisted specimens.

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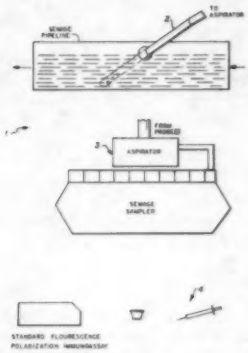
**4,941,360**

**CONTINUOUS (FLEXIBLE) SEWAGE MONITORING MACHINE FOR SAMPLING BUILDING EFFLUENT TO MEASURE FOR CERTAIN CONTROLLED SUBSTANCES**

**Oliver B. McClellan, 1101 Post Oak Blvd. #300-318, Houston, Tex. 77056, and Samuel J. Castorani, 4545 Post Oak Pl., #310, Houston, Tex. 77027**

**Filed Jun. 14, 1989, Ser. No. 366,646**
**Int. Cl.[5] G01N *1/14***
**U.S. Cl. 73—864.34** **1 Claim**

1. A sampling system to obtain samples from the sewage effluent system of a structure or building for the purpose of collectively analyzing the urine and/or feces from the occupants of the structure or building for determination of the presence of controlled substances in a non-intrusive manner, said sampling system comprising a hollow, flexible, elongated probe extending in a non-horizontal direction through a sample tap of a effluent pipeline associated with the structure or building, the probe including a plurality of openings positioned along its elongated wall portion, and collectively in a direction parallel to the longitudinal axis of the probe, to permit sample to flow into the probe, and a closed first end; a fluidic line having two ends, the first end of the fluidic line being coupled to a second open end of the elongated probe that is positioned outside of the pipeline; an aspirator fluidly coupled to the second end of the fluidic line to draw sample from the pipeline



through the plurality of openings, probe and fluidic line, and subsequently deposit the sample into a sample holder, the sample holder being only one of a plurality of sample holders that are sequentially filled in an automatic manner with an equal number of samples over a predetermined period of time, whereby the samples in the holders are subsequently analyzed for controlled substances, whereby the occupants of the structure or building are collectively tested for use of controlled substances in a nonintrusive manner.

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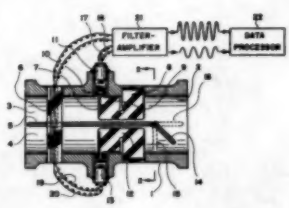
**4,941,361**

**THREE-IN-ONE FLOWMETER**

**Hyok S. Lew, 7890 Oak St., Arvada, Colo. 80005**

**Filed Jun. 20, 1988, Ser. No. 208,739**
**Int. Cl.[5] G01F *1/32***
**U.S. Cl. 73—861.24** **14 Claims**




1. A multifunction flow measuring apparatus comprising in combination:

(a) a first flow passage including a first means for measuring rate of fluid flow;

(b) a second flow passage including a second means for measuring rate of fluid flow;

(c) a variable position fluid dynamic target obstructing fluid flow through said second flow passage wherein degree of blockage of said second flow passage decreases as the rate of fluid flow through said apparatus increases;

(d) means for determining volume flow rate of fluid moving

through said apparatus from a combination of outputs from said first and second means for measuring rate of fluid flow; and

(e) means for determining mass flow rate of fluid moving through said apparatus from a combination of the volume flow rate and the outputs from said first and second means for measuring rate of fluid flow.

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**4,941,362**

## TORQUE AND ANGULAR DISPLACEMENT SENSING IN CONTROLLED WRENCHES

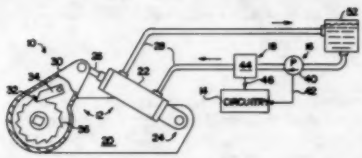
**Angelo Tambini, County Wicklow, Ireland, assignor to SPS Technologies, Inc., Newtown, Pa.**

**Continuation-in-part of Ser. No. 67,896, Jun. 29, 1987, Pat. No. 4,823,616. This application Jan. 3, 1989, Ser. No. 292,688**

**The portion of the term of this patent subsequent to Apr. 25, 2006, has been disclaimed.**

**Int. Cl.[5] B23P *19/06*; B25B *12/143***

**U.S. Cl. 73—862.23** **13 Claims**




10. A controlled wrench apparatus, comprising:

a power wrench mechanism driven by a pressurized fluid to turn a wrench head for tightening a threaded fastener;

transducer means for sensing a signal in proportion to the torque applied by said wrench head;

transducer means for sensing the flow of said fluid to said wrench mechanism to derive a signal in proportion with the angular displacement of said wrench head;

circuit means for processing said torque and said angular displacement signals to indicate when a predetermined threshold is reached.

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**4,941,363**

## SENSOR FOR MEASUREMENT OF THE TORQUE ACTING ON A ROTATING SHAFT

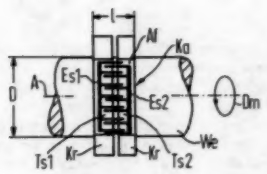
**Guenter Doemens, Holzkirchen, and Markus Gilch, Hoergertshausen, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jul. 26, 1989, Ser. No. 385,815**

**Claims priority, application Fed. Rep. of Germany, Aug. 11, 1988, 3827301; May 24, 1989, 3916959**

**Int. Cl.[5] G01L *3/10***

**U.S. Cl. 73—862.33** **36 Claims**




1. An arrangement for measuring the torque acting on a rotating shaft comprising:

a capacitor arrangement formed by first and second electrode structures, each electrode structure having a plurality of parallel, spaced electrodes;

first and second means adapted for respectively mechanically coupling said first and second electrode structures to respective points axially spaced a first distance from each other on a shaft whose torque is to be measured, said first distance between said points changing due to torsion of said shaft in an amount proportional to the torque acting on said shaft and said first and second means for coupling being moveable relative to each other due to said torsion;

means for asymmetrically mounting said first and second electrode structures on said first and second means for coupling insulated from each other in a common plane with said electrodes of said first and second electrode structures forming electrode pairs parallel to each other, with the electrodes of each electrode pair being spaced a second distance from each other approximating the change in said first distance between said measuring points due to torsion of said shaft and the spacing between the electrodes in each electrode pair changing in an amount corresponding to said relative movement of said first and second means for coupling due to said torsion, each electrode pair forming a capacitor having a capacitance which changes as the spacing between the electrodes of the pair changes, and with neighboring electrodes on either side of each electrode pair being spaced a third distance from said electrode pair which is large in comparison to said change in said first distance due to torsion of said shaft; and

means for electrically connecting said capacitors formed by said electrode pairs in parallel to obtain a total capacitance change which is the sum of the capacitance change of each of said electrode pairs and which is a measure of the torque acting on said shaft.

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**4,941,364**

## HOLDER FOR MOLTEN METAL SAMPLING DEVICE

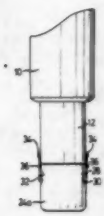
**Gary H. Haughton, Burlington, Canada, assignor to Evacuo Enterprises Limited, Hamilton, Canada**

**Continuation-in-part of Ser. No. 240,506, Sep. 6, 1988. This application Sep. 13, 1989, Ser. No. 406,529**

**Claims priority, application United Kingdom, Sep. 9, 1987, 8721185; May 5, 1989, 8910406**

**Int. Cl.[5] G01N *1/12***

**U.S. Cl. 73—864.53** **8 Claims**



1. A holder for a molten metal sampling device, comprising:

a pipe which is elongated in a given direction, the pipe having an upper portion and a lower portion, the lower portion defining an internal guidance chamber and having an opening lying in a plane making an angle with respect to said given direction, the opening communicating with the guidance chamber, the upper portion being adapted to receive and retain the molten metal sampling device in such a way that molten metal in the guidance chamber can be sampled by the sampling device,

a closure element for said opening, the closure element having a density such that it will seek to float upwardly in molten metal outside the pipe,

and a protective cover enclosing said closure element and a lower part of said pipe, the protective cover having at least two separate parts,

and retaining means for holding the separate parts of the

protective cover together around the closure element and the lower part of the pipe, the retaining means being adapted to fail upon contact with the molten metal.

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## 4,941,365
## DEVICE FOR DETERMINING THE MASS OF A MOTOR VEHICLE

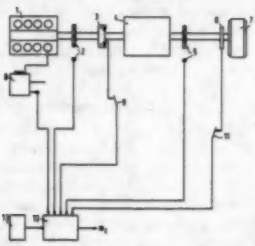
**Klaus Reiner, Feilbach-Schmiden; Heinz Rieker, Waldenbuch, and Josef Stoll, Remseck, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed Nov. 14, 1989, Ser. No. 436,028**

**Claims priority, application Fed. Rep. of Germany, Dec. 24, 1988, 3843818**

**Int. Cl.[5] G01D *21/00*; G01G *19/08***

**U.S. Cl. 73—865** **20 Claims**



1. Device for determining the mass of a motor vehicle utilizing signal transmitters for vehicle engine torque, signal transmitters for vehicle speed and acceleration, signal transmitters for indicating engagement states of a clutch between the vehicle engine and vehicle drive train and a computer evaluating the signals from these signal transmitters;

wherein, during a first operating vehicle phase and with the clutch disengaged, the computer determines a coefficient for the running resistance of the vehicle in accordance with the equation

$$f_E = b_a / g,$$

in which

$f_E$ = a coefficient dependent on the running resistance

$b_a$ = the acceleration value of the vehicle with the clutch disengaged

$g$ = gravitational acceleration;

wherein during a second operating vehicle phase with the clutch engaged, the computer repeatedly determines values for the acceleration of the vehicle;

wherein the computer then repeatedly determines a value correlated with the mass of the vehicle by forming a quotient of engine torque, determined repeatedly during the second operating phase, and a quantity dependent on the difference between a vehicle acceleration value and the vehicle coefficient of running resistance;

wherein a signal transmitter device reproduces the particular ratio of the transmission; and

wherein the computer calculates a value $m_{Ei}$ correlated with the vehicle mass according to

$$m_{Ei} = \frac{\eta \cdot i_G / r}{b_{ei} - b_a} M_{Mi} - \frac{b_{ei} \cdot i_G^2 / r^2}{b_{ei} - b_a} J_M$$

in which

$b_{ei}$ = acceleration values of the vehicle with the clutch engaged

$\eta$ = the efficiency of the drive train

$i_G$ = ratio of the transmission

$r$ = dynamic rolling radius of the drive wheels

$J_M$ = moment of inertia of the engine

$M_{Mi}$ = values of the drive torques and engine torques

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## 4,941,366
## COAXIAL TYPE STARTER DEVICE

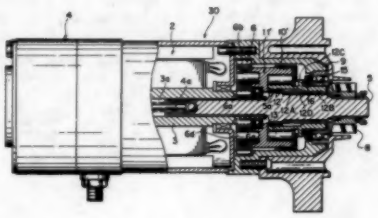
**Shuzoo Isozumi, Himeji, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 13, 1989, Ser. No. 337,789**

**Claims priority, application Japan, Apr. 13, 1988, 63-50276[U]; Apr. 26, 1988, 63-104707**

**Int. Cl.[5] F02N *15/02*; F16D *43/00***

**U.S. Cl. 74—6** **3 Claims**



1. A coaxial type starter device, comprising:

(a) an armature rotational shaft (3) of an electric motor (2);

(b) an output rotational shaft (5) slidably supported on one and the same axis as said armature rotational shaft and having a pinion (8) on a front end thereof;

(c) an overrunning clutch device (10) provided between said armature shaft and said output shaft, wherein rotation of said armature shaft is transmitted to said output shaft through said overrunning clutch device, and

(d) means for absorbing high external loads applied to said output shaft through said pinion, said absorbing means including a deformable elastic member (16) disposed in abutment with an inner race (12; 12') of said overrunning clutch device.

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## 4,941,367
## ROTARY TO LINEAR MOTION CONVERTER

**Richard L. Konves, 1500 E. Warren #33, Santa Ana, Calif. 92705**

**Filed Nov. 25, 1988, Ser. No. 276,244**

**Int. Cl.[5] F16H *25/12, 23/08***

**U.S. Cl. 74—53** **18 Claims**

1. A rotary-to-linear motion converter comprising:

support means determining a roll axis, and a pitch axis passing through a first common point, the axes being mutually orthogonal;

an input shaft having an interior end, said input shaft rotating on said roll axis and having an offset drive cam formed on a said input shaft interior end, said offset drive cam being positioned at said first common point;

rocker means operatively supported by said support means and having a rocker means pitch axis and a rocker means yaw axis, said rocker means pitch axis and said rocker means yaw axis being mutually orthogonal and passing through a second common reference point;

pitch bearing means for pivotally coupling said rocker means to said support means so that said rocker means

pitch axis is pivotally rotatable about said support means pitch axis, whereby said second common point is coincident with said first common point;

rocker cam means for rotating on said rocker means yaw axis and for translating rotary motion from said offset drive cam into oscillatory pitch motion for said rocker means along said rocker means pitch axis;

output shaft means slidably coupled to said support means; and

pivot arm means for translating said oscillatory pitch motion of said rocker means into reciprocating linear motion for said output shaft means.

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**4,941,368**

## STOP SCREW WITH DROP-IN BALL

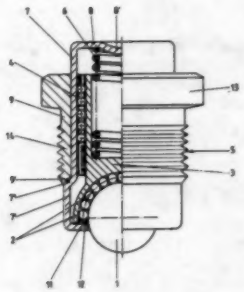
**Johannes De Boer, Madenhausen, and Manfred Tröster, Bad Kissingen, both of Fed. Rep. of Germany, assignors to FAG Kugelfischer Georg Schafer (KGaA), Fed. Rep. of Germany**

**Filed Jan. 23, 1989, Ser. No. 300,471**

**Claims priority, application Fed. Rep. of Germany, Mar. 12, 1988, 3808375**

**Int. Cl.[5] G05B 5/06**

**U.S. Cl. 74—527** **5 Claims**



1. A stop screw with a drop-in ball comprising:

a screw supporting housing comprising a cup like inner part with a bottom end and an opposite first top end at which the drop-in ball is supported; the bottom end of the inner part includes receiving means for receiving a spring thereon; the inner part having a widened region of wider cross-section in the axial region thereof toward and at the drop-in ball; the widened region having a rear end where the widened region widens to the wider cross-section of the widened region;

a ball supporting body disposed inside the cup like inner part, the body including a second top end toward the first top end of the inner part for receiving the drop-in ball;

a linear ball bearing between the ball supporting body and the inner part for enabling relative axial shifting;

a hollow screw housing attached to and extending around the inner part, the screw housing having an external screw thread for being screwed into means for receiving the thread in an object which holds the stop screw the screw housing further having an external profile region for being engaged by a screw tightening means, such that the profile region is engaged for moving the screw housing which tightens the external thread into the means for receiving the thread;

the screw housing having a front end which rests axially against the widened region of the inner part for being tightened thereagainst upon tightening of the external thread into the means for receiving the thread;

a coil spring between the ball supporting body and the receiving means at the bottom end of the inner part; the receiving means comprises an arched central projection shaped for the coil spring to fit therearound; the coil spring extending to the ball support body and the ball support body including means thereon for receiving the coil spring.

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**4,941,369**

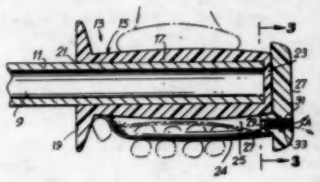
## BICYCLE HANDLE GRIP ASSEMBLY

**Brian Specht, Northport, and Robert Ippolito, Massapequa, both of N.Y., assignors to Cycle Products Company, Commack, N.Y.**

**Filed Apr. 6, 1989, Ser. No. 334,617**

**Int. Cl.[5] B62K 21/26**

**U.S. Cl. 74—551.9** **4 Claims**



1. A handle grip assembly for a handle of a bicycle of comprising:

a grip member having an inner surface defining opening for receiving the end of a handle of a bicycle, an outside surface, and an outside end member;

a flexible housing disposed along at least a portion of said outside surface and defining a cavity located between said a least a portion of said outside surface and said housing;

a cap member mounted on said end member of said grip member;

a pathway being unobstructed to enable the air to flow from the inside cavity to the outside, located in said cap member and leading from inside of said cavity of said flexible housing to the outside;

means for producing a sound response to air leaving said cavity and passing through said pathway;

wherein said housing may be compressed from the outside thereof to cause air to leave said cavity to the outside through said pathway.

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**4,941,370**

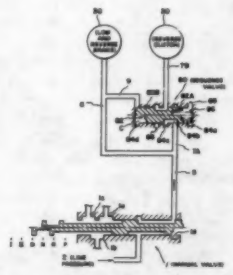
## SELECT SHOCK ATTENUATION ARRANGEMENT FOR AUTOMATIC AUTOMOTIVE TRANSMISSION

**Yoshihiko Ishii, Fuji, Japan, assignor to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Jun. 23, 1988, Ser. No. 216,569**

**Int. Cl.[5] B60K 41/10**

**U.S. Cl. 475—128** **6 Claims**



1. In a transmission

a first hydraulically operated friction element;

a second hydraulically operated friction element;
a source of hydraulic pressure;
a first valve interposed between said first and second friction elements and said source, said first valve being selectively conditionable to supply hydraulic pressure from said source to said first and second friction elements; and
a sequence valve interposed between said second friction element and said first valve, said sequence valve being responsive to the level of pressure which is supplied to said first friction element in a manner wherein, until the pressure supplied to said first friction element reaches a predetermined level, said sequence valve assumes a condition wherein hydraulic pressure is cut-off from said second friction element and said second friction element is connected with a drain port formed in said sequence valve.

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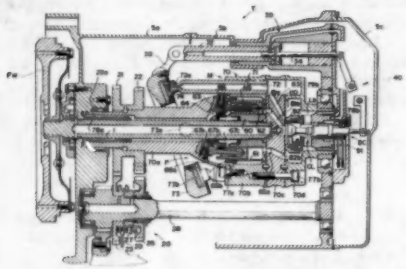
**4,941,371**

**HYDRAULIC CONTINUOUSLY VARIABLE SPEED TRANSMISSION WITH DIRECT CLUTCH VALVE**

**Hideo Koyama; Koji Sasajima, both of Tokyo; Kazuya Maki, Aichi; Kouji Yamaguchi, and Yoshikazu Ishikawa, both of Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 19, 1988, Ser. No. 259,962**
**Claims priority, application Japan, Oct. 20, 1987, 62-264844; Oct. 20, 1987, 62-264842; Oct. 27, 1987, 62-271198**
**Int. Cl.[5] B60K *41/16***
**U.S. Cl. 74—865** **13 Claims**



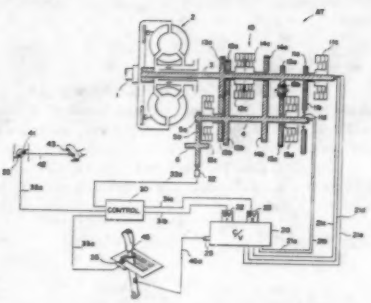
1. A hydraulic continuously variable speed transmission with a direct clutch valve comprising:
a hydraulic pump connected to an engine in a vehicle;
a hydraulic motor connected to an output shaft;
a hydraulic closed circuit for hydraulically connecting said hydraulic pump and said hydraulic motor;
a direct clutch valve placed in said closed circuit to block said closed circuit;
a speed reduction ratio control actuator for varying displacements of at least one of said hydraulic pump and said hydraulic motor to control speed reduction ratio; and
a direct clutch valve controlling device for controlling operations of said direct clutch valve to block the closed circuit when the speed reduction ratio becomes substantially "1" in accordance with the actuation of said speed reduction ratio control actuator;
wherein, said direct clutch valve controlling device maintains direct connecting state in which said closed circuit is being blocked by said direct clutch valve when an actual engine speed is higher than a direct clutch disconnecting reference engine speed set in accordance with a parameter indicating driver's intention of acceleration,
and then said direct clutch valve control device releases the blocking of the closed circuit by said direct clutch valve when a drop of the actual engine speed from the direct clutch disconnecting reference engine speed exceeds a predetermined amount corresponding to a vehicle speed of said vehicle.

**4,941,372**

**APPARATUS FOR SHIFT CONTROL IN AN AUTOMATIC TRANSMISSION**

**Takashi Aoki, Saitama; Satoshi Terayama, Tokyo, and Junichi Miyake, Saitama, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 10, 1989, Ser. No. 309,437**
**Claims priority, application Japan, Feb. 10, 1988, 63-029608**
**Int. Cl.[5] B60K *41/00***
**U.S. Cl. 74—878** **6 Claims**



1. An apparatus for shift control in an automatic transmission on a motor vehicle, said automatic transmission having a transmission mechanism including first, second, third and fourth speed ranges and a manually operable shift lever movable selectively into a plurality of different shift range positions, so that the speed ranges will automatically be shifted in a selected one of the shift ranges dependent on running conditions of the motor vehicle, comprising:
a maximum speed range cut-off switch which is manually turned on and off selectively, the arrangement being such that the setting of a maximum speed range in each of the shift ranges is prohibited by turning on said maximum speed range cut-off switch, and the setting of the fourth speed range is prohibited when said maximum speed range cut-off switch is being turned on, and wherein the shift ranges include a shift range D at which the automatic shift control is carried out within the 1st through the fourth speed ranges and a shift range S at which the automatic control is carried out within the 1st through the third speed ranges, the setting of the fourth speed range is prohibited by turning on said maximum speed range cut-off switch when said shift range D is selected, and the setting of the third speed range is prohibited by turning on said maximum speed range cut-off switch when said shift range S is selected.

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**4,941,373**

**ROTARY OPENER AND CLOSER FOR SCREWS, SCREW CLOSURES ON BOTTLES, JARS AND THE LIKE**

**Wolfgang Jobmann, Gudrunstrasse 73, D-2000 Hamburg 56, Fed. Rep. of Germany**

**Filed Jul. 27, 1989, Ser. No. 385,410**
**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1988, 3830684**
**Int. Cl.[5] B67B *7/18***
**U.S. Cl. 81—3.4** **11 Claims**

1. Rotary opener and closer for screw closures, comprising: two converging side walls, which project vertically downwards from a rotary plane in the use position and which are interconnected at ends where they have their greatest spacing by an approximately semicircular side wall; and

a rough surface for engaging an edge of the closure being provided on at least one of the side walls,

wherein the rough surface is formed on a spring steel strip, which internally engages on at least one of the side walls and is only fixed to one side wall at one fixing point.

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**4,941,374**

## PROCESS AND APPARATUS FOR THE LOADING OF PALLETS IN LAYERS

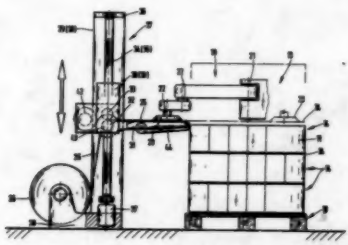
**Heinz Focke, Verden, Fed. Rep. of Germany, assignor to Focke & Co. (GmbH & Co.), Verden, Fed. Rep. of Germany**

**Filed May 20, 1988, Ser. No. 196,577**

**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3720933**

**Int. Cl.[5] B65G *57/04***

**U.S. Cl. 83—13** **10 Claims**



1. Process for the loading of pallets or the like in layers with stackable articles, especially packaging cartons, with a palletiser having a raisable, lowerable and pivotable cantilever arm which is equipped with at least one joint and the free end of which has a holding member, in the form of a suction holder, for grasping individual articles, whereby intermediate layers consisting of paper are introduced between layers of the articles, characterised by: only after each layer of individual articles, respectively, has been completed, laying an intermediate layer (24) onto the completed layer of articles in the correct position by causing the suction holder of the cantilever arm (19) also to grasp, by suction, the intermediate layer; and by producing the intermediate layers from a web of paper material (25) by causing the cantilever arm (19) to draw the web, in portions corresponding to the size of the intermediate layers, onto the top of the carton layer (14) to be covered, and then severing the web.

**4,941,375**

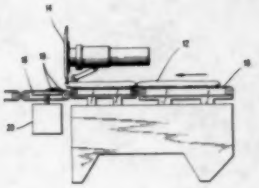
## SLICE THICKNESS CONTROL FOR AN AUTOMATIC SLICING MACHINE

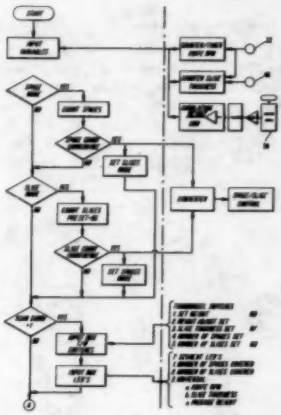
**Frank S. Kasper, Orland Park, Ill., assignor to AMCA International Corporation, Hanover, N.H.**

**Filed Mar. 26, 1985, Ser. No. 716,089**

**Int. Cl.[5] B26D *5/26***

**U.S. Cl. 83—23** **8 Claims**





1. A method for controlling the slicing of a food product to produce a draft of slices having a predetermined weight, comprising the steps of:

cutting the food product to produce a slice thereof;

determining the thickness of said slice;

weighing said slice;

determining the cross-sectional density of said slice from its thickness; and

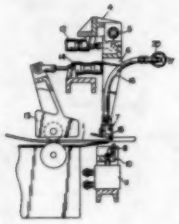
controlling the thickness of a subsequently cut slice in accordance with the determined cross-sectional density, the desired weight and a number of slices remaining to be cut in the draft to produce a final draft having said predetermined weight.

4,941,376

## APPARATUS FOR CUTTING WEB FOR BEVERAGE CONTAINERS

Yuzo Otsuka, Tokyo, Japan, assignor to AB Tetra Pak, Lund, Sweden

Filed May 8, 1989, Ser. No. 348,992
Claims priority, application Japan, May 10, 1988, 63-062037[U]
Int. Cl.[5] B26D *1/62, 7/06;* B23D *25/06*
U.S. Cl. 83—100 8 Claims



2. An apparatus according to claim 1, wherein at least a part of said suction ports is disposed at a position directly facing an inner area in the cut-off tubular body, said inner area being formed by the resiliency of the cut-off tubular body.

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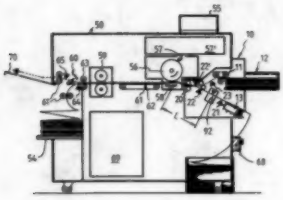
4,941,377

## APPARATUS FOR FEEDING A CONTINUOUS FORM AND CUTFORMS

Takeyuki Ishihara, Tokohama, and Tetsuo Kanno, Fujisawa, both of Japan, assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Sep. 23, 1988, Ser. No. 248,682
Claims priority, application Japan, Oct. 9, 1987, 62-253926
Int. Cl.[5] B26D *5/28;* B41J *11/00*
U.S. Cl. 83—211 4 Claims



1. An apparatus for feeding a continuous form and cutforms which is unitized and is able to be mounted on and removed from the main body of a business machine, comprising:

a single form feeding passage to the main body of said business machine,

a cutform feeding passage for feeding cutforms to said single form feeding passage and a cutform feeding means located upstream thereof,

a continuous-form feeding passage for feeding a continuous form to said single form feeding passage and a tractor for feeding a continuous form located upstream thereof, and

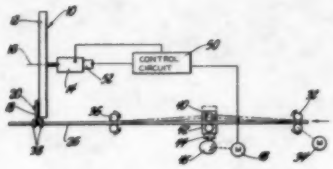
a continuous-form cutting means provided in said continuous-form feeding passage, which operates in response to a signal for causing the continuous form to be cut so that cutforms can be fed after cutting and ejecting the continuous form if the cutforms are to be fed between uses of the continuous form.

4,941,378

## METHOD AND APPARATUS FOR RAPID REPETITIVE CUTTING

George K. Snyder, Lockport, N.Y., assignor to General Motors Corpooration, Detroit, Mich.

Filed Oct. 24, 1988, Ser. No. 261,307
Int. Cl.[5] B23D *21/04;* B26D *1/28*
U.S. Cl. 83—350 7 Claims




1. The method of cutting an element at a cutting site comprising the steps of;

continuously rotating a knife through complete revolutions about a knife rotation axis,

periodically moving the knife to the cutting site for one knife rotation for cutting the tube, and

moving the knife away from the cutting site for a plurality of continuous complete knife rotations by traversing the axis through a path at a rate requiring a plurality of continuous complete knife rotations for each traverse of the path.

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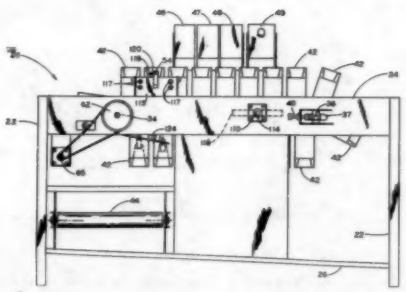
4,941,379

## APPARATUS FOR PRODUCING SIZED CONTROLLED PORTIONS OF MEAT

Geno N. Gasbarro, 1401-B Lakeshore Dr., Columbus, Ohio 43204

Filed Jun. 12, 1989, Ser. No. 364,232
Int. Cl.[5] B26D *7/06;* B26F *3/00;* A72C *71/00*
U.S. Cl. 83—409.2 15 Claims



1. An automatic meat processing apparatus for producing a plurality of meat portions having a selected size and weight comprising, in combination; (1) a support frame; (2) a plurality of mandrels mounted on said frame and aligned in adjacent relationship to one another for continuous travel along said frame in a predetermined path, each of said mandrels including a vertically extending rear wall, a pair of spaced outwardly extending side walls carried by said rear wall, and a front wall yieldably mounted in a spaced relationship to said rear wall and spring biased away from said rear wall, said walls defining a sizing chamber having a predetermined configuration, volume and top opening for receiving a selected meat portion; (3) a loading station along said predetermined path of travel of said mandrels defined at a position along said frame wherein said opening of said sizing chamber is facing generally up-

wardly; (4) an unloading station along said predetermined path of travel of said mandrels defined at a selected position wherein said first opening of said mandrels is inverted relative to its position at said loading station; and (5) knife means mounted on said frame and disposed at a selected position along the path of travel of said mandrels to engage and separate any excess meat extending above said first opening of said sizing chamber.

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**4,941,380**

## MACHINES FOR CUTTING CARDBOARDS AND LIKE MATERIALS

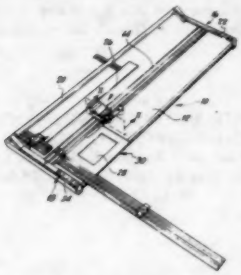
**Robin C. Lockwood, East Norton, England, assignor to Keencut Limited, Corby, England**

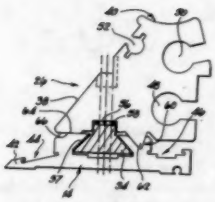
**Filed Mar. 15, 1989, Ser. No. 324,410**

**Claims priority, application United Kingdom, Mar. 17, 1988, 8806385**

**Int. Cl.[5] B26D *3/02***

**U.S. Cl. 83—455** **10 Claims**





1. A cutting machine, comprising:

(a) a base board to support a workpiece such as a cupboard to be cut;

(b) a clamp bar extending across the base board to clamp materials to be cut;

(c) a cutter head adjustably captively slidably mounted on the clamp bar for lost motion inhibiting lengthwide sliding movement with respect thereto to cut said materials;

(d) co-operating guide means on the clamp bar and the cutter head comprising a guideway on one of the clamp bar and the cutter head, and a guide member on the other one of the clamp bar and cutter head, said guideway being a recessed V-shaped slot having opposite sides and said guide member being a complementary outwardly tapering protrusion having opposite sides and correspondingly contoured to be slidingly received in said slot, said protrusion having sliding contact on both sides of said V-shape; and

(e) additional interengaging sliding support surfaces rigidly disposed on said cutter head and said clamp bar, said additional surfaces being spaced from said guideway and guide member.

**4,941,381**

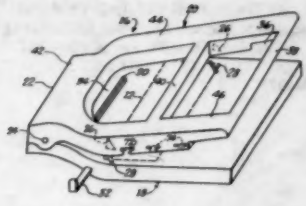
## PORTABLE BUSINESS CARD SLIT CUTTER

**Darryl M. Garner, Boca Raton, Fla., assignor to Sandra Brown Garner, Tampa, Fla.**

**Filed Jan. 10, 1988, Ser. No. 204,894**

**Int. Cl.[5] B26F *1/18***

**U.S. Cl. 83—468.94** **8 Claims**



1. A portable slit cutter for cutting slits in a sheet for the purpose of holding a business card, said slit cutter comprising:

a base member having a plurality of pairs of angled slit openings, each pair of openings being spaced from the remaining pairs of openings and each opening of each pair of openings being spaced from the other opening of that pair of openings;

a cutting member rotatably affixed to said base member, said cutting member having a plurality of pairs of blade receivers each aligned with one of said openings when said cutting member is rotated towards said base; and

a pair of pointed blades inserted into one of said plurality of pairs of said blade receivers;

said slit openings and blades being positioned to cut said slits on said sheet, when said sheet is inserted between said base member and said cutting member, at a separation to permit opposite diagonal corners of said business card to be inserted therein, the particular one of said pairs of blade receivers having said blades positioned therein determining the position of said slits on said sheet.

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**4,941,382**

## SAWMILL CARRIAGE

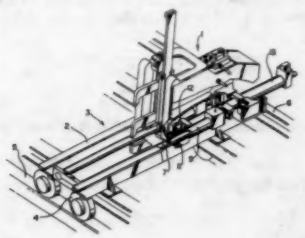
**Thomas G. Smith, and Edward C. Smith, both of Renboro, Canada, assignors to T.S. Manufacturing, Lindsay, Canada**

**Continuation of Ser. No. 36,555, Apr. 9, 1987, abandoned. This application Mar. 29, 1989, Ser. No. 331,020**

**Claims priority, application Canada, Dec. 22, 1986, 525958**

**Int. Cl.[5] B27B *29/08***

**U.S. Cl. 83—713** **3 Claims**



1. In a sawmill carriage capable of reciprocating on rails towards and away from a saw, and provided with more than one bunk having an upper surface capable of supporting a log, and a knee mounted on each said bunk, capable of gripping a log and moving across said bunk in a direction normal to the

direction of reciprocation of said carriage, the improvement comprising cylindrical slides securely attached to said bunk beneath said upper surface, parallel to the direction of travel of said knee for supporting said knee; and complimentary bushings securely attached to said knee and cooperating with said slides.

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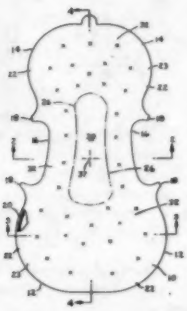
**4,941,383**
**METHOD FOR TUNING VIOLINS**
**John Hogue, 436 S. Saginaw St., Flint, Mich. 48502**
**Filed Oct. 31, 1988, Ser. No. 264,352**
**Int. Cl.[5] G10D *1/02***
**U.S. Cl. 84—275** **14 Claims**



1. A method of manufacturing and tuning a plate for a wooden violin comprising the steps of:
   a. forming the plate to a predetermined plan configuration and curvature, having a relatively thinner outer periphery and a relatively thicker central axis portion, with an overall thickness slightly greater than the desired thickness of the tuned plate;
   b. holding the plate in a manner to avoid completely dampening the vibrational action of the plate;
   c. tapping the surface of the plate at a selected location remote from the holding location, starting at the relatively thinner sections near the outer periphery of the plate, to produce an audible sound;
   d. controllably removing material in proximity to the tapping location where the audible sound is higher than the desired audible sound, thereby lowering the audible sound;
   e. working inward from the outer periphery of the plate as the desired audible sound is produced, staring with the thinnest sections of the plate and gradually working towards the central axis portion of the plate where the thicker sections of the plate are located, to manufacture and tune a wooden violin plate to the desired audible sound.

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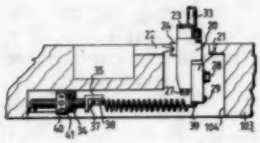
**4,941,384**
**GUITAR**
**Harald Jäger, Gesslerstrasse 5, D-1000 Berlin 62, Fed. Rep. of Germany**
**Filed Mar. 8, 1989, Ser. No. 320,640**
**Claims priority, application Fed. Rep. of Germany, Sep. 19, 1988, 3832127**
**Int. Cl.[5] G10D *3/12***
**U.S. Cl. 84—313** **16 Claims**

1. A guitar comprising a releasable device for clamping the strings to the nut, the ball ends being secured to a base part movable around a knife edge and disposed in a recess in the body and comprising adjustable string riders and tension springs engaging the base part, characterised in that
   (a) the clamping device comprises clamping jacks (2), an adjustable end pressure plate (3) with a set screw (7) and an eccentric pressure plate (4) movable by an eccentric lever (8) and between which the strings are clamped;
   (b) the base part (20) has string riders (23), spacer plates (26), through bores (31) for the strings and an adjustable spring-retaining block (21) at which tension springs (39) engage, the ball ends being disposed between the through bores



and the spring-retaining block, and a prim is provided and is adjustable in position;
   (c) the other spring ends are secured to a spring-holding bracket (35) connected to a tightening nut (40) by a tension-adjusting screw (37) with interposition of a tension casing (34).

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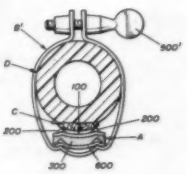
**4,941,385**
**TONE PLATE AND CLAMPING DEVICE FOR A MUSICAL INSTRUMENT MOUTHPIECE**
**Conrad O. Johnson, 2414 Rosewood, Houston, Tex. 77004**
**Filed May 22, 1989, Ser. No. 355,664**
**Int. Cl.[5] G10D *9/02***
**U.S. Cl. 84—383 R** **8 Claims**



1. An improved tone plate for positioning a reed on a mouthpiece of a musical instrument, comprising:
   a support plate for insertion into a reed clamping device;
   a pair of longitudinal rails each of which is generally triangular in cross-section disposed on an upper surface of said support plate substantially parallel to the axis of the mouthpiece against which a reed can rest for positioning the reed against the mouthpiece;
   an upper relatively sharp edge on the apex of each of said rails for contacting the reed and supporting the reed away from contact with any other part of the tone plate; and
   a resilient mount disposed on a lower surface of said tone plate.

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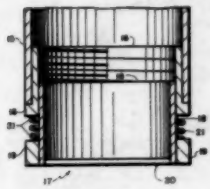
**4,941,386**
**RESONATOR TUNING ADJUSTMENT FOR KEYBOARD PERCUSSION INSTRUMENTS**
**Leigh H. Stevens, Asbury Park, N.J., assignor to The Selmer Company, Elkhart, Ind.**
**Continuation of Ser. No. 114,484, Oct. 28, 1987, abandoned.**
**This application May 22, 1989, Ser. No. 355,784**
**Int. Cl.[5] G10D *13/08***
**U.S. Cl. 84—410** **14 Claims**

1. Tuning adjustment means for a resonator tube of a keyboard percussion instrument comprising a cap having a tubular portion threadedly received within the lower end of said resonator tube whereby rotation of said cap in one direction advances said cap into said resonator tube to shorten the air

column thereof and rotation of said cap in the opposite direction moves said cap outwardly of said resonator tube to lengthen the air column thereof, sealing means for providing a pneumatic seal between the mating threaded portions of said



resonator tube and said cap, and holding means for holding said cap in rotational position with respect to said resonator tube, said sealing means comprising mating threads on said cap and said resonator tube and a viscous material interposed therebetween.

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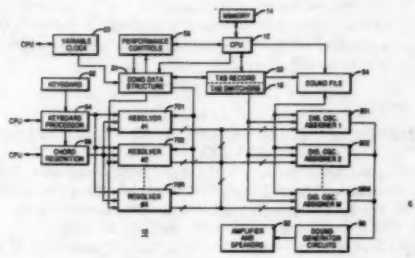
**4,941,387**

## METHOD AND APPARATUS FOR INTELLIGENT CHORD ACCOMPANIMENT

**Anthony G. Williams, and David T. Starkey, both of San Diego, Calif., assignors to Gulbransen, Incorporated, San Diego, Calif.**

**Filed Jan. 19, 1988, Ser. No. 145,093**
**Int. Cl.[5] G10H *7/00***
**U.S. Cl. 84—609** **3 Claims**



1. A method for providing a musical performance by an electronic musical instrument comprising the steps of:

a. transposing a song having a plurality of sequences, each of the sequences having a plurality of notes, into the key of C-major and pre-recording the song with its plurality of sequences;

b. organizing the pre-recorded plurality of transposed sequences into a song data structure for playback by the electronic musical instrument;

c. organizing data within the song data structure into a sequence of portions including a header portion, an introductory sequence portion, a normal musical sequence portion, and an ending sequence portion;

d. reading from the song data structure status information stored in the header portion of the data structure;

e. proceeding to a next sequential portion of the sequence of portions;

f. getting a current time command from the header portion;

g. determining if the time to execute a current command has arrived yet;

h. continuing to step i. if the time has arrived, otherwise jumping back to step g.;

i. fetching a current event;

j. determining if a track of the current event is active;

k. continuing to step l. if the track of the current event is active, otherwise jumping back to step g.;

l. determining if a current track resolver of the current event is active;

m. continuing if the current track resolver is active to step n.;

n. selecting a resolver;

o. resolving the current event note into wavetable data; and synthesizing the wavetable data into a musical note.

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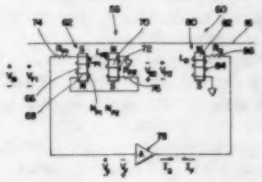
**4,941,388**

## STRING VIBRATION SUSTAINING DEVICE

**Alan A. Hoover, 4220 E. 11th St., Indianapolis, Ind. 46201, and Gary T. Osborne, 6052 N. Guilford Ave., Indianapolis, Ind. 46220**

**Filed May 12, 1989, Ser. No. 350,338**
**Int. Cl.[5] G10H *3/18, 3/24***
**U.S. Cl. 84—726** **32 Claims**



1. A sustaining device for prolonging the vibration of a string of a stringed musical instrument having magnetic pickup means responsive to a change in the magnetic field caused by vibration of the string, the sustaining device comprising

a magnetic string driver means in magnetic proximity to the pickup means,

an amplifier means coupled between the pickup means and the driver means for amplifying current from the pickup means to the driver means to impart sufficient magnetic drive energy to the driver means to produce sustained vibration of the string, and

unbalancing means for creating a magnetic imbalance between the pickup means and the driver means to minimize direct magnetic feedback between the pickup means and the driver means.

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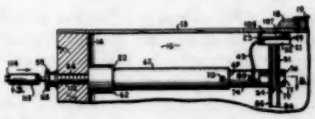
**4,941,389**

## ELECTRONIC PICKUP WITH MOUNTING ASSEMBLY FOR A HOLLOW BODIED MUSICAL INSTRUMENT

**David C. Wendler, 1302 E. 19th, Lawrence, Kans. 66044**

**Filed Aug. 22, 1988, Ser. No. 234,487**
**Int. Cl.[5] G10H *3/14, 3/00, 3/18***
**U.S. Cl. 84—727** **16 Claims**



1. A pickup for a stringed musical instrument having a hol-

low body with an interior at least partially enclosed by a soundboard panel mounting the musical instrument strings, which comprises:

(a) a coil including:

(1) a bobbin including a concentric center post;

(2) an inner winding wound concentrically in a first direction on said bobbin;

(3) an outer winding wound concentrically on said bobbin around said inner winding;

(4) said windings being of substantially equal length and each having first and second ends;

(5) said first and second ends of said inner and outer windings connected at first and second winding terminals;

(b) a coil mounting assembly including:

(1) a male threaded tube extending through an opening in said instrument body and threadably mounting a nut on the exterior of said instrument body;

(2) an end plug having a female-threaded bore threadably receiving said threaded tube;

(3) an outer, tubular guide member having a bore communicating with said end plug bore and having proximate and distal ends, said guide member proximate end mounting said end plug;

(4) an inner, reciprocative tube telescopically received in said outer guide tube bore and having proximate and distal ends, said proximate end being received within said outer guide tube bore and said distal end having an end receiver extending transversely through said inner tube in proximity to said inner tube distal end, said inner tube having a coaxial bore intersecting said end receiver and a side opening;

(5) a column sleeve having proximate and distal ends and a bore extending therebetween, said sleeve being slidably received in said inner tube end receiver;

(6) a resilient, elastomeric, fluted column insulator received in said sleeve bore, said column insulator having an insulator bore coaxial with said sleeve bore and receiving said bobbin post;

(7) a nonferromagnetic coil housing mounted on said bobbin post and enclosing said coil;

(8) an inner tube set screw threadably received in said outer tube in proximity to said outer tube distal end, said inner tube set screw being adapted to impinge upon said inner tube within said outer tube bore; and

(9) a sleeve set screw threadably received in said inner tube and adapted to impinge upon said sleeve within said inner tube bore;

(c) a magnet having first and second poles;

(d) a ferromagnetic flux lens having an inner side with a concavity and an outer side, said lens terminating at a peripheral rim at said lens inner side, said rim being positioned in proximity to said second coil;

(e) said lens outer side being secured to an interior surface of said soundboard in axial alignment with said coil;

(f) said magnet being mounted at least partly within said concavity with said magnet first pole in closely-spaced proximity to said coil and said magnet second pole being attached to said lens inner side; and

(g) an electrical lead comprising first and second insulated wires connected to said coil first and second terminals respectively and conductive shielding connected to said coil housing, said lead extending through said inner tube side opening, through a portion of said inner tube, through said outer tube bore and terminating at female connection jack means at said threaded tube.

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**4,941,390**

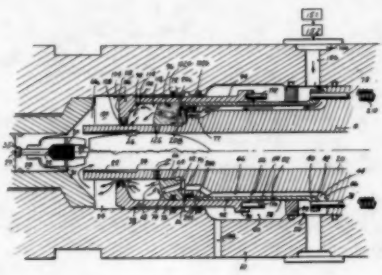
## LIQUID PROPELLANT GUN

**Melvin J. Bulman, Shelburne, Vt., assignor to General Electric Company, Burlington, Vt.**

**Filed Aug. 7, 1980, Ser. No. 178,254**

**Int. Cl.[5] F41F 1/04**

**U.S. Cl. 89—7** **8 Claims**



5. A liquid propellant gun comprising:

a housing,

a gun barrel,

a differential annular valve,

a differential annular piston,

said housing, barrel, valve and piston defining a fill chamber, a pumping chamber and a combustion chamber, and

valve means when under relatively low pressure for precluding the flow of liquid propellant from said pumping chamber into said combustion chamber and when under relatively higher pressure for permitting the flow of liquid propellant from said pumping chamber into said combustion chamber.

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**4,941,391**

## DRIVING PISTON BRAKING MEANS FOR EXPLOSIVE POWDER ACTUATED SETTING DEVICE

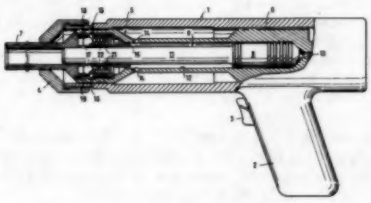
**Gerhard Ehmig, Rankweil; Peter Jochum, Meiningen, both of Austria, and Erich Maurer, Mauren, Liechtenstein, assignors to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein**

**Filed Jun. 12, 1989, Ser. No. 365,222**

**Claims priority, application Fed. Rep. of Germany, Jun. 10, 1988, 3819813**

**Int. Cl.[5] B25C 1/14**

**U.S. Cl. 89—1.14** **7 Claims**



1. Explosive powder actuated setting device comprising an axially extending piston guide (5) having a leading end and a trailing end and forming a barrel (12), an axially extending driving piston (8) axially displaceably mounted in said barrel (12), said piston guide (5) having a recess therein opening radially outwardly from said barrel (12), a braking ball (17) located in said recess (16) and in contact with said piston (8), and spring means within said recess for contact with said braking ball, wherein the improvement comprises that said

driving piston (8) has a ready-to-fire position and a fired position, said recess (16) has a dimension in the axial direction of said piston guide (5) greater than the diameter of said braking ball, said spring means arranged to bias said braking ball against said piston in the fired position of said piston, said recess has a first end surface extending transversely of the axial direction of said piston and located closer to the leading end of said piston guide and said braking ball contacts said first end surface in the fired position.

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4,941,392

## SCATTER AMMUNITION CONTAINER

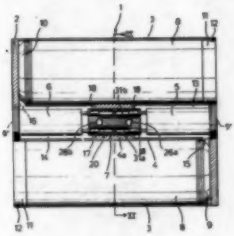
Horst Huetter, Tegernsee, Fed. Rep. of Germany, assignor to Messerschmitt-Boelkow-Blohm GmbH, Muenchen, Fed. Rep. of Germany

Filed Dec. 22, 1989, Ser. No. 455,972

Claims priority, application Fed. Rep. of Germany, Dec. 22, 1988, 3843164

Int. Cl.[5] F41F *3/06, 5/02*

U.S. Cl. 89—1.51 8 Claims



1. A scatter ammunition container system having a longitudinal axis, comprising a plurality of container tube means for ejecting ammunition bodies contained in said tube means, gas generator means for generating pressurized gas, valving means for connecting said gas generator means to said tube means for supplying pressurized gas to said tube means for said ejecting, central tubular means arranged concentrically to said longitudinal axis and surrounded by said container tube means, said gas generator means comprising two gas generators (5, 6) arranged in axial alignment with each other in said central tubular means to form ring chambers (13, 14) around said gas generators, said valving means (7) comprising a slide member (7) arranged in said central tubular means intermediate said two gas generators, said slide member comprising through flow channels (21) each leading at one end into a respective one of said ring chambers, said valving means further comprising a non-return valve (22) located in each of said through flow channels (21) for closing each through flow channel in one direction of gas flow while permitting gas flow in the opposite direction, said slide member further having ports leading into said through flow channels, said ports being closed when said slide member is in a centered rest position in said central tubular means, said slide members (7) retaining said centered rest position when both gas generators are fired simultaneously for a substantially symmetrical scattering of said ammunition bodies, said slide member (7) being axially displaced in one direction out of said centered rest position in response to a firing of one gas generator and in response to a sequential firing of both gas generators for opening one of said through flow channels for a non-symmetrical scattering of said ammunition bodies, and means for arresting said slide member (7) in an axially displaced position for said non-symmetrical scattering.

4,941,393

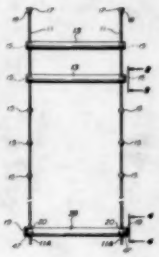
## LOADING APPARATUS FOR AMMUNITION

Richard E. Dodd, Santa Ana, and William C. Baldwin, Costa Mesa, both of Calif., assignors to North American Dynamics, Tustin, Calif.

Filed Sep. 11, 1989, Ser. No. 405,338

Int. Cl.[5] F42B *39/08*

U.S. Cl. 89—35.01 12 Claims



1. Ammunition transport apparatus comprising:

first and second parallel wire ropes of equal length;

a plurality of first interconnection means attached to each said wire rope, each first interconnection means on said first wire rope being disposed opposite a first interconnection means on said second wire rope;

a plurality of tubes;

attachment means located at opposite ends of each said tube for receiving one of said first interconnection means and attaching each of said plurality of tubes to said first and second wire ropes;

each said attachment means comprising:

a central opening means for receiving a said first interconnection means;

a first slot means opening into said central opening means;

a second slot means opening into said central opening means; and

said first and second slot means cooperating to pass said wire rope on either side of a said first interconnection means received in said central opening means;

second interconnection means located at each end of each said first and second wire ropes such that a second interconnection means at one end of said first wire rope lies opposite a second interconnection means at one end of said second wire rope and such that a second interconnection means at an opposite end of said first wire rope lies opposite a second interconnection means on an opposite end of said second wire rope; and

connector tube means for joining the oppositely disposed second interconnection means at the respective ends of said first wire rope and at the respective ends of said second wire rope.

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4,941,394

## HAND-HELD AUTOMATIC FIREARM

Ulrich Zedrosser, and Walter Schwarz, both of Steyr, Austria, assignors to Steyr-Daimler-Puch AG, Vienna, Austria

Filed Sep. 7, 1989, Ser. No. 404,114

Claims priority, application Austria, Sep. 28, 1988, 2390/88

Int. Cl.[5] F41A *19/02*

U.S. Cl. 89—129.02 6 Claims

1. A hand-held automatic firearm comprising

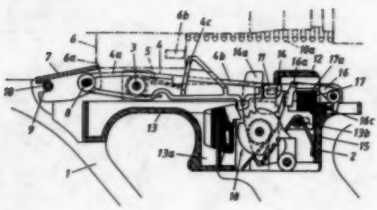
a receiver, which defines a slider path extending in a longitudinal direction,

a firing mechanism, which is mounted in said receiver and is operable to discharge a round and comprises a slider, that comprises a catching lug and is mounted in said receiver

to be movable along said slider path forwardly from a rear position and rearwardly to said rear position,

a slider spring, which biases said slider forwardly along said path, and

a trigger mechanism including a catch lever, which is pivoted in said receiver on an axis which is transverse to said longitudinal direction, which catch lever is pivotally movable to and from a catching position and has a forward end portion, and a catch pawl, which is pivoted to said forward end portion of said catch lever and engages said catching lug to arrest said slider as it moves forwardly



from said rear position when said catch lever is in said catching position,

a catch lever spring, which urges said catch lever away from said catching position,

catch lever locking means for locking said catch lever in said catching position against the force of said lever spring,

an abutment fixed to said receiver, and

said catch pawl having a first end portion, which is pivoted to said catch lever for a lost motion generally in said longitudinal direction, and a second end portion, which is pivotally supported on said abutment.

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**4,941,395**

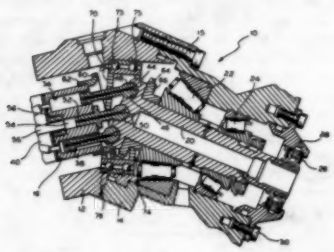
**BENT-AXIS HYDRAULIC APPARATUS**

**Richard W. Reynolds, and Mark S. Stroze, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.**

**Filed Sep. 8, 1988, Ser. No. 241,701**

**Int. Cl.[5] F01B *13/04***

**U.S. Cl. 92—57** **8 Claims**



1. A spline drive for a hydraulic unit having a case, a rotatable cylinder block with a plurality of reciprocal pistons and a rotatable shaft having a total drive angle therebetween, the axes of rotation of said cylinder block and rotatable shaft being at equal angles which together provide the total drive angle and an end of said pistons being movably connected to the drive shaft whereby there is rotation of the cylinder block and rotatable shaft with simultaneous reciprocation of the pistons, said spline drive comprising: two annular series of external teeth with a series on each of the cylinder block and the rotatable shaft; a ring gear having two spaced-apart sets of internal teeth; and means rotatably mounting the ring gear within the case and at a location bisecting the total drive angle to have two non-diametrically opposed tooth meshes between a set of ring gear internal teeth and the series of teeth on the cylinder block and between the other set of ring gear internal teeth and the series of teeth on the rotatable shaft.

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**4,941,396**

**RECIPROCATING DOUBLE-ENDED PISTON**

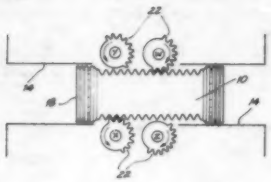
**Peter J. McCabe, 12 Riverside Road, Lansvale, New South Wales 2166, Australia**

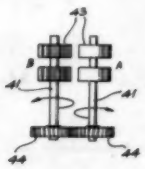
**Filed Nov. 28, 1988, Ser. No. 276,679**

**Claims priority, application Australia, Nov. 27, 1987, P15641**

**Int. Cl.[5] F01B *9/00***

**U.S. Cl. 92—136** **8 Claims**





1. A double ended piston for use in a reciprocating internal combustion engine, said double-ended piston having heads at both end portions, and a center portion having at least one pair of rack means substantially along the longitudinal axis of said piston, and wherein said pair of rack means are located on a pair of parallel flat surfaces along the length of said central portion, and wherein there are two crankless shafts for each rack, each having a gear sprocket per crankless shaft, wherein the gear's teeth extend around approximately one half the circumference of each gear sprocket and the crankless shafts are intermeshed to provide co-ordinated rotational force.

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**4,941,397**

**PISTON ASSEMBLY FOR INTERNAL COMBUSTION ENGINE**

**Makoto Kawai; Kazuhito Nakamura, and Minoru Kageyama, all of Hamamatsu, Japan, assignors to Suzuki Jidosha Kogyo Kabushiki Kaisha, Japan**

**Filed May 18, 1989, Ser. No. 283,211**

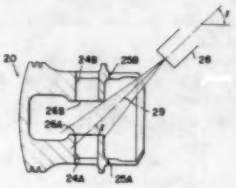
**Claims priority, application Japan, Dec. 11, 1987, 62-312109**

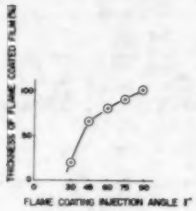
**Int. Cl.[5] F16J *1/04***

**U.S. Cl. 92—223** **11 Claims**

6. A piston for an internal combustion engine comprising: a piston body having a head portion and a skirt portion extending axially rearwardly relative to the head portion; means defining a pair of transversely extending bosses in the piston body, the bosses having respective inner faces in spaced-apart opposed relation to each other and having respective bores in axial alignment with each other, the bosses being suitably spaced apart to receive therebetween one end of a connecting rod which undergoes swinging slidable movement relative to the boss inner faces during use of the piston; and a flame-coated film flame-coated on the opposed inner faces of the bosses, the

flame-coated film being composed of a material having lubricating and hardness properties effective to reduce abrasion and




wear of the boss inner faces due to swinging slidable movement of the connecting rod during use of the piston.

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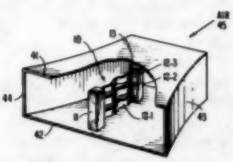
**4,941,398**

## OSCILLATING REED AND METHOD

**Joseph W. Morris, Columbia, and Thomas A. Melbourne, Laurel, both of Md., assignors to Bowles Fluidics Corporation, Columbia, Md.**

**Filed Jun. 3, 1981, Ser. No. 270,041**
**Int. Cl.[5] B60H *1/34*; F24F *13/10***
**U.S. Cl. 98—2** **23 Claims**



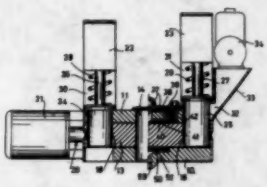

1. In an air flow system having a source of air pressure flowing through a channel to an outlet means to issue as a sweeping air stream pattern, a resilient reed oscillator element having an upstream end and a downstream end, means securing said downstream end to said outlet means in fixed relation relative to said upstream end so that said upstream end is freely oscillatable, solely by air flow, between a pair of extreme positions, said extreme positions being spaced from the wall surfaces defining said outlet means and said channel and a weight member on said upstream end, the improvement wherein said resilient reed oscillator element is at least one thin strip member consisting of a single layer of elongated fibers bound in a resin matrix to improve the fatigue strength of said resilient reed oscillator element as compared to spring steel, all of said enlongated fibers being parallel to one another.

**4,941,399**

## AUTOMATIC APPARATUS FOR THE PREPARATION OF EXPRESSO COFFEE

**Elia Zacchetti, Borgarello, Italy, assignor to Brasilia Srl, Italy**

**Filed Jan. 26, 1989, Ser. No. 301,922**
**Claims priority, application Italy, Jan. 26, 1988, 19204 A/88**
**Int. Cl.[5] A47J *31/34***
**U.S. Cl. 99—289 P** **12 Claims**



1. In an automatic apparatus for preparation of one of more servings of expresso coffee, such apparatus including a rotatable board provided with at least one cylindrical through hole with a size suited for holding a predetermined amount of fresh coffee grounds, said board being driven into rotation by motor means so that said at least one cylindrical through hole assumes, consecutively, three pre-set positions for the charging and pressing of the fresh coffee grounds, for the infusion with hot water under pressure into the coffee grounds and for the discharge of used coffee grounds, respectively, said board being rotatingly housed between two fixed plates, of which the top plate supports means for the charging of desired amounts of fresh coffee grounds in said at least one cylindrical through hole, means for the pressing of the ground coffee disposed is said at least one cylindrical through hole, and ejection means for discharging the coffee grounds, said charging and pressing means and said ejection means being mounted in diametrically opposed positions with respect to said rotatable board, the improvement wherein the said top plate is fitted with a support for an infusion shower of hot water under pressure at the infusion position, said support having a cylindrical cavity in which is slidingly disposed a piston, said cavity being connected, through flow interception valve means, to a supply of hot water under pressure, said shower being mounted under said piston and being connected with said cavity above said piston both through first non return valve means openable under a pre-set pressure and through second relief valve means, said lower plate being provided, at said infusion position, with a filter seating cavity in communication with a delivery spout for the prepared expresso coffee, said first non return valve means being set to open when the hot water feeding pressure is higher than a pre-set value, and said second relief valve means being pre-set to vent residual pressure under said shower and piston.

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**4,941,400**

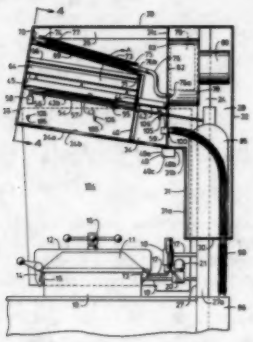
## VENTLESS HOOD FOR A DEEP FAT FRYER

**David O. Moore, Eaton, Ohio, assignor to Henny Penny Corporation, Eaton, Ohio**

**Filed Sep. 28, 1989, Ser. No. 413,913**
**Int. Cl.[5] A47J *37/12*; F24C *15/20*; B01D *47/02***
**U.S. Cl. 99—403** **16 Claims**

1. A ventless hood assembly for a commercial deep fat frying pressure cooker having a cooking pot with a lockable cover in which cooking is performed by a heated bath of cooking oil and steam under pressure derived from the moisture in the food being cooked, said hood assembly comprising an inverted L-shaped structure having a vertical rearward portion extending upwardly from the rear of said cooker and a forward open-bottom portion spaced from and overlying said pot, filter means supported above said pot by and within said forward hood portion, a fan mounted in said rearward hood portion and positioned to draw ambient air and cooking gasses through

said filter means, a water tank containing a water bath mounted on the rear of said cooker, a heat exchanging radiator mounted within said forward hood portion above said filter means and ahead of said fan, pump means to recirculate water from said tank through said radiator and back to said tank to cool said water bath, means to introduce excess steam and vaporized cooking oil into said water bath to maintain a predetermined



pressure within said cooking pot, means at the end of the cooking cycle to introduce substantially all of the steam and vaporized cooking oil in said cooking pot into said water bath prior to opening said cooking pot cover, and means to vent non-condensables, uncondensed steam and vaporized cooking oil and unabsorbed odors directly from said water tank to said open bottom of said hood forward portion.

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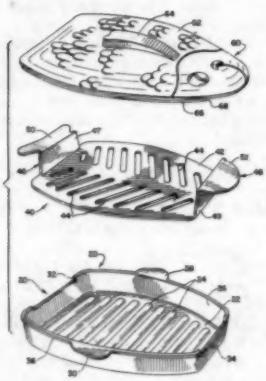
**4,941,401**

## MICROWAVEABLE FISH POACHER

**Norton Sarnoff, Northbrook, and Carl R. Fletcher, Arlington Heights, both of Ill., assignors to Ensar Corporation, Wheeling, Ill.**

**Filed Jan. 9, 1990, Ser. No. 462,612**
**Int. Cl.[5] A47J *27/00*; H05B *6/80***
**U.S. Cl. 99—446** **6 Claims**



1. An elongated microwaveable fish poacher comprising a non-metallic, plastic base, rack and cover, and defining a fish poacher interior,

said base being dish-shaped and comprising a floor and an upstanding peripheral sidewall and a pair of handles which extend outwardly beyond said cover so as to enable said base, rack and cover to be carried together by said handles,

said rack comprising a perforated fish supporting base and a pair of handles which extend outwardly beyond said base so as to enable said rack and cover to be carried together by said rack handles,

said cover comprising a cover portion for overlying said base and said rack and defining a depending lip confronting said upstanding peripheral sidewall, and a handle which enables said cover to be removed from said base and rack,

means on one of said rack base and said floor for elevating said rack base above said floor,

notch means defined by at least one of said upstanding peripheral wall and said depending lip, and

said rack handles being disposed in and extending outwardly through said notch means.

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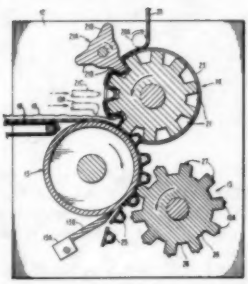
**4,941,402**

## APPARATUS FOR ENCAPSULATING FILLER WITH DOUGH

**Joseph C. D'Alterio, 64 Sugar Maple La., Glen Cove, N.Y. 11542**

**Filed May 24, 1989, Ser. No. 356,221**
**Int. Cl.[5] A21C *9/00, 9/06***
**U.S. Cl. 99—450.6** **9 Claims**



1. An apparatus for continuously encapsulating a filler with fresh dough in the form of a multiplicity of dough capsules containing said filler, which comprises;

a cylindrical feed roller,

a pocket-forming roller with axially and circumferentially equispaced cavities in its cylindrical surface and with a circumferential thin ridge projecting from said surface between each pair of said axially spaced cavities, said pocket-forming roller being positioned parallel to, and in contact with, an upper quadrant of said feed roller,

a cutting roller with circumferentially equispaced flutes extending lengthwise in said cutting roller and with a lengthwise thin ridge projecting from said cutting roller between each pair of said spaced flutes, said cutting roller being positioned parallel to, and in contact with, the lower quadrant of said feed roller below said upper quadrant, and

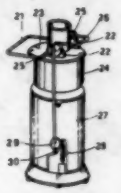
synchronous drive means to rotate said feed roller in one direction and to rotate said pocket-forming roller and said cutting roller in the opposite direction so that a sheet of said dough with said filler thereon and a second sheet of said dough supplied to the bite of said feed roller and said pocket-forming roller are first formed and cut into longitudinal strips of linked capsules containing said filler and then said strips are cut transversely in the bite of said feed roller and said cutting roller to yield said multiplicity of said dough capsules.

**4,941,403**

## JUICE EXTRACTOR MACHINES FOR FRUIT AND VEGETABLES

**Antonio Cimenti, Via Baron 15, S. Dona' di Piave (VE), Italy (30027)**

**Filed Jul. 1, 1988, Ser. No. 214,434**
**Int. Cl.[5] A23N *1/00***
**U.S. Cl. 99—492** **9 Claims**



1. A juice extracting machine comprising:
a substantially cylindrical body having two axially-oriented slots which are substantially diametrically opposed to each other;
a substantially cylindrical extraction chamber attached to an upper portion of the body;
a cover attached to an upper portion of the extraction chamber, said cover having an opening to receive a pestle to press material from which juice is to be extracted into the extraction chamber;
two upper support means attached to or integral with an upper surface of the cover;
a first substantially U-shaped lever having a closed end and two free ends, wherein each of the two free ends includes engagement means and is connected in an oscillatory manner to one of the upper support means;
a second substantially U-shaped lever having a closed end and two free ends, wherein each of the two free ends includes lower support means positioned in one of the two slots of the body and is connected in an oscillatory manner to the body, said second lever being positioned such that the closed end is able to cooperate with said engagement means;
and switching means within the body to allow for actuation of a motor within the body;
wherein oscillation of the first lever when the closed end of the second lever is engaged with the engagement means allows the engagement means to displace the second lever in an axial direction with respect to the body, thus clamping the cover while simultaneously actuating the switching means.

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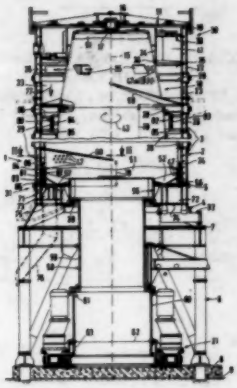
**4,941,404**

## SCREW PRESS

**Kurt Tegtmeyer, Salzgitter, Fed. Rep. of Germany, assignor to Salzgitter Maschinenbau GmbH, Salzgitter, Fed. Rep. of Germany**

**PCT No. PCT/EP87/00671, § 371 Date Aug. 11, 1988, § 102(e) Date Aug. 11, 1988, PCT Pub. No. WO88/04989, PCT Pub. Date Jul. 14, 1988**
**PCT Filed Nov. 4, 1987, Ser. No. 272,895**
**Claims priority, application Fed. Rep. of Germany, Jan. 2, 1987, 3700016**
**Int. Cl.[5] B30B *3/02***
**U.S. Cl. 100—117** **13 Claims**

13. A screw press, comprising a housing having a spray casing and a screen casing arranged within said spray casing and forming an annular space therebetween; at least one press spindle located within said screen casing and forming a pressing space therebetween, said at least one press spindle having a plurality of wing members and at least one axial zone free of said wing members; and at least one dewatering member which is supported by said housing and located in said at least one axial zone in said pressing space between said spindle body and said screen casing, said at least one dewatering member being hollow and provided with a plurality of perforations and also having an outlet which opens into said annular space between said screen casing and said spray casing, said at least one dewatering member being arranged at a radial distance from said



spindle and said screen casing; and at least one carrier holding said at least one dewatering member; means for rinsing said at least one dewatering member and including at least one rinsing line introduced into said dewatering member, said rinsing means also including a rinsing fluid source and a connection line extending through said housing and connecting said rinsing fluid source with said rinsing line, said connection line being formed as said carrier.

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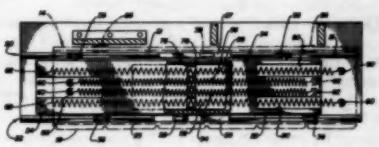
**4,941,405**

## DRIVING MECHANISM FOR RECIPROCATING PRINT SHUTTLE

**Cliff Helms, Temecula, Calif., assignor to Dataproducts Corporation, Woodland Hills, Calif.**

**Filed Dec. 16, 1987, Ser. No. 133,556**
**Int. Cl.[5] B41J *3/10***
**U.S. Cl. 101—93.04** **39 Claims**



1. An apparatus comprising:
a base;
a carriage mounted for reciprocating movement on said base;
means for movably supporting the carriage on the base with minimal resistance to linear oscillation of the carriage relative to the base;
at least one printhead mounted on the carriage;
a counterbalancing mass mounted on the base for reciprocating movement with respect to the carriage;
at least one spring interconnecting the carriage and the counterbalance mass a permit oscillatory movement of the carriage and the counterbalancing mass as a natural reso-

nant frequency defined by the masses of the carriage and counterbalancing mass and the spring constant of the spring, wherein said at least one spring remains in expanded tension throughout the oscillation of the carriage and the counterbalancing mass; and

drive means supported by the base and coupled to the carriage for imparting a variable force sufficient to maintain oscillation of the carriage and counterbalancing mass at substantially said natural resonant frequency.

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**4,941,406**

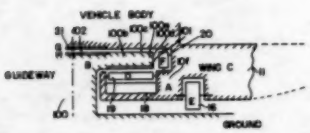
## MAGNETIC AND AERODYNAMIC LEVITATION VEHICLE

**Joachim E. Lay, 5371 Wild Oak Dr., East Lansing, Mich. 48823**

**Filed Jun. 9, 1988, Ser. No. 204,542**

**Int. Cl.[5] B61B *13/08*; B64F *3/00***

**U.S. Cl. 104—23.1** **4 Claims**




1. A vehicle for travel along a rail which comprises:

(a) an enclosed fuselage having a longitude axis, a front end, a rear end opposite the front end and opposed sides between the ends and having a cross-sectionally T-shaped slot along and parallel to the axis of the fuselage adapted for mounting the fuselage on a cross-sectionally T-shaped rail the rail having a cross-member including spaced apart arms projecting horizontally under the fuselage wherein the T-shaped slot is around an underside of the arms of the cross-member of the T-shaped rail;

(b) at least four wheels mounted on the fuselage for contacting a surface which supports the fusclage on the wheels when at rest;

(c) wings mounted on the sides of the fuselage to which provide lift when the vehicle is in motion;

(d) magnetic attraction means mounted on the underside of the cross member of the T-shaped rail and on a top side of the arms of the fuselage such that the arms and cross member are spaced apart when the wheels are on the ground;

(e) first roller means mounted on the arms between the magnetic attraction means and the cross-member such that the first roller means rides on the underside of the cross-member when the vehicle is in motion, wherein the first roller means has an axis of rotation which is horizontal and perpendicular to the axis of the fuselage;

(f) second roller means mounted adjacent the arms and spaced from opposed ends of the cross member of the T-shaped rail and having a vertical axis of rotation perpendicular to the axis of the fuelage and the first roller means; and

(g) propulsion means mounted at the rear of the fuselage for propelling the vehicle along the T-shaped rail such that when the vehicle is propelled the combination of lift from the wings and lift from the magnetic attraction means raises the wheels from the surface, and wherein the first and second roller means guide the vehicle along the rail.

**4,941,407**

## AUTOMATED GUIDED VEHICLE SYSTEM

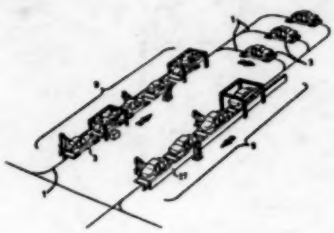
**Norman B. Pigott, Bishop's Stortford, England, assignor to Litton U. K. Limited, United Kingdom**

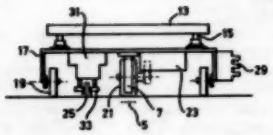
**Filed Mar. 30, 1988, Ser. No. 175,109**

**Claims priority, application United Kingdom, Apr. 1, 1987, 8707790**

**Int. Cl.[5] B60L *11/12***

**U.S. Cl. 104—289** **5 Claims**






1. A vehicle assembly line having an automated unmanned vehicle guidance system, said system comprising, in combination with the unmanned vehicle;

a plurality of discrete physically constraining track portions for guiding a vehicle having the ends thereof spaced apart,

at least one path for vehicle movement which does not have any physically constraining track and which extends between at least one of said physically constraining track portions and at least one end of another of said physically constraining track portions,

means whereby said vehicle receives driving power from an external power source at the location of said track portions to move said vehicle at a first selected speed along the physically constraining track portions,

a power source on-board the vehicle to provide driving power for moving the vehicle at a second selected speed slower than the first selected speed along the path which does not have any physically constraining track between said track portions, and

means whereby the vehicle receives direction guidance signals during movement along the at least one path not having any physically constraining track whereby to cause said vehicle to be moved by said on-board power source between said physically constraining track portions.

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**4,941,408**

## ADJUSTABLE FRAME FOR RAIL WHEELS ON MOTOR VEHICLES ADAPTABLE TO RIDE ON RAILROAD TRACKS

**Estel L. Lovitt, Jr., 5102 Brenden Way, Sylvania, Ohio 43560**

**Filed Dec. 15, 1988, Ser. No. 284,592**

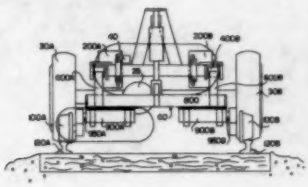
**Int. Cl.[5] B61D *15/00***

**U.S. Cl. 105—72.2** **1 Claim**

1. An apparatus for adjustment of auxiliary rail wheels that are rotatably mounted on a land based motor vehicle with a frame that is affixed with such auxiliary rail wheels for maneuvering such vehicle on rails, said apparatus comprising:

(a) an upper support member having two ends affixed to the

underside of the motor vehicle frame, said upper support member being a parallelopiped-shaped member with a rectangular cross-sectional configuration and having a hollow interior, said upper support member being disposed transversely to longitudinally extending front to rear central axis of said motor vehicle, said upper support member having a pair of rotatable arms wherein each rotatable arm has an upper end and a lower end, with the upper ends rotatably affixed on each end of said support member adapted to be moved up or down in an arc of



ninety degrees from a horizontal position to a vertical position;

(b) a lower transverse beam connected to the lower ends of each of said rotatable arms, said lower transverse beam having rail wheel axles connected to a pair of slidable adjustment members on each end on said lower transverse beam adapted to slide back and forth along the ends of said lower transverse beam, with rail wheels rotatably affixed on each slidable adjustment member, to move the rail wheels in or out relative to one another.

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**4,941,409**

## WHEEL SET GUIDANCE FOR TRUCKS OF RAIL VEHICLES, ESPECIALLY COMMUTER TRAFFIC VEHICLES

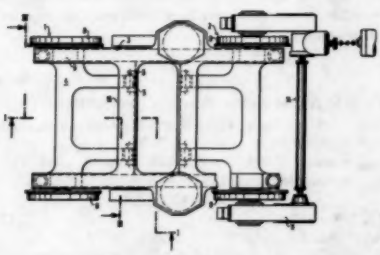
**Wolfgang-Dieter Richter, Winkelhaid; Engelbert Weeger, Nuremberg; Lutz Uebel, Heroldsberg, and Erhard Foerster, Lilienthal, all of Fed. Rep. of Germany, assignors to MAN Gutehoffnungshütte AG, Oberhausen and Bremer Strassenbahn AG, Bremen, both of, Fed. Rep. of Germany**

**Filed Mar. 15, 1989, Ser. No. 323,635**

**Claims priority, application Fed. Rep. of Germany, Mar. 15, 1988, 3808593**

**Int. Cl.[5] B61F** *3/08, 5/30*

**U.S. Cl. 105—157.1** **3 Claims**



1. In a wheel set guidance for trucks of rail vehicles, especially commuter traffic vehicles, which includes a first wheel set and a second wheel set, with the wheels of a given one of said wheel sets being pivotably connected with a cross-member of a truck frame via a respective frame structure about an axis of rotation that is disposed horizontally and transverse to the direction of travel, and with primary springs being provided between said frame structures and longitudinal members of said truck frame, whereby a car body is also spring-suspended relative to said longitudinal members of said truck frame via secondary springs, the improvement therewith wherein:

said truck is provided with four wheels, which are embodied as free wheels in which each of said wheels is independently connected to said frame structure by a separate short axle, with two of said free wheels forming said first wheel set, and two other of said free wheels forming said second wheel set;

each of said free wheels is connected to said frame structure by a secure-against-tilt and tip-resistant means via a pedestal bearing;

each of said frame structures has a U-shaped and twist-resistant torsionally-stiff box girder section and is connected, in the vicinity of said longitudinal members and within the same, via two mountings to a respective one of said cross-members of said truck frame in such a way as to be pivotable in a vertical direction; and

said free wheels of said second wheel set are interconnected by means to preclude any independent rotating thereof including a torsionally-stiff arrangement via gear means and also adapted to be driven by a drive motor.

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**4,941,410**

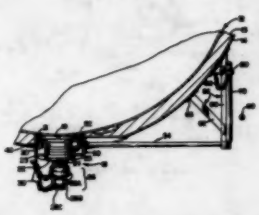
## OUTLET VALVE ASSEMBLY WITH AN EXTENDED HANDLE FOR A RAILWAY TANK CAR

**Thomas H. Dalrymple, Crown Point, and Richard L. Zagrocki, Griffith, both of Ind., assignors to Union Tank Car Company, East Chicago, Ind.**

**Filed Oct. 13, 1988, Ser. No. 257,423**

**Int. Cl.[5] B61D** *5/00;* **F16K** *51/00, 31/00*

**U.S. Cl. 105—358** **5 Claims**



1. In a railway tank car having a generally cylindrical tank supported at its oppositely disposed ends on trucks disposed to ride on railway tracks, an outlet valve assembly comprising:

a valve mounted at the bottom of said cylindrical tank for discharging downwardly between the railway tracks and operable between a closed position to occlude flow through said valve and an open position to permit flow through said valve, a shaft operably connected to and extending from said valve on a horizontal axis perpendicular to the longitudinal axis to operate said valve between said closed and open positions;

a support means mounted to said tank for supporting said shaft at a region spaced from said valve, said support means includes a bracket assembly comprising a generally vertically oriented channel for receiving a distal end of said shaft, said bracket assembly further includes an upwardly angled strut connecting said channel to said tank; and

a handle connected to said shaft at a predetermined distance from said valve for rotation of said shaft, said handle extending generally radially outwardly from said shaft, said handle extending generally radially outwardly from said shaft and connected to said shaft such that swinging of said handle through an arc in a plane parallel to the longitudinal axis of said cylindrical tank is operative to move said valve between said closed and open positions as said handle is swung from an initial orientation to a final orientation, the length of said handle and said predeter-

mined distance between said valve and said handle connection to said shaft being such as to permit a person to swing said handle between its initial orientation and its final orientation while standing outside of the railway tracks.

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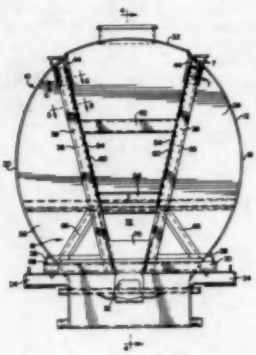
4,941,411

## STEEL END STRUCTURE FOR ALUMINUM RAILCAR

Stephen D. Wong, Oakville, Canada, assignor to Procor Ltd., Canada

Filed Mar. 1, 1989, Ser. No. 317,442
Int. Cl.[5] B61D *17/00*
U.S. Cl. 105—421 17 Claims



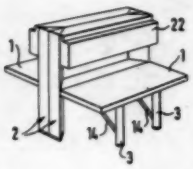
1. In a railcar having an aluminum body portion comprising aluminum side sheets and aluminum end sheets, and a side sill secured to a lower marginal portion of each of said side sheets and extending lengthwise of the car; an improved steel end structure assembly connected to said aluminum body portion, comprising: a steel center stub sill assembly located generally on the longitudinal centerline of the body portion, steel body bolsters extending transversely of said body portion intermediate an outer end of said center stub sill assembly and the ends of said side sills; a steel shear plate supported on and attached to said body bolsters and said center stub sill; a pair of spaced-apart steel end stiffener members extending between and secured to the upper surface of said shear plate and to said end sheet and said side sheets; said end stiffener members having a depth that increases from the top toward the bottom thereof; said end stiffener members extending downwardly and inwardly from an upper portion of said side sheets towards a portion of said shear plate above said center stub sill assembly; said end stiffener members being secured at a top portion thereof to a first aluminum connector plate that is secured to said end sheet and said side sheet; said end stiffener members being secured at an intermediate portion thereof to an aluminum bracket member secured to said end sheet; and said bracket member being an elongated angle bracket member having a first leg portion in contact with and secured to said end sheet and a second leg portion in contact with and secured to said intermediate portion of said stiffener member.

4,941,412

## MODULAR WORKING TABLE

Hartmut S. Engel, Freiberg am Neckar, Fed. Rep. of Germany, assignor to Ernst Fischer GmbH & Co., Freudenstadt, Fed. Rep. of Germany

Filed Aug. 12, 1988, Ser. No. 231,754
Claims priority, application Fed. Rep. of Germany, Aug. 14, 1987, 3727193
Int. Cl.[5] A47B *3/06*
U.S. Cl. 108—156 15 Claims




1. Working table comprising:
working surface;
first and second front support elements and first and second rear support elements for supporting said working surface;
each of said rear support elements comprising a hollow section having a tubular central part with an outer periphery, coupling channels formed on said tubular central part and distributed around said outer periphery, and with at least two coupling flanges which extend along at least a part of said hollow section, said coupling flanges subtending an angle to one another;
coupling elements secured to said working surface at a position corresponding to said first and second rear support elements and being complementary in shape to said coupling flanges;
means for connecting said coupling elements to said coupling flanges in form and force-locked manner;
said coupling channels being orientated in two planes which extend perpendicular to one another and provided with respective projections; and
first, second and third cover sections comprising a first planar cover section plate fixable between said coupling flanges, and first and second angled cover sections being fixable in each case between a said coupling flange and a said projection of a said coupling channel, said cover sections together with said hollow section forming a closed hollow section having a cross-section in the form of a right triangle.

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4,941,413

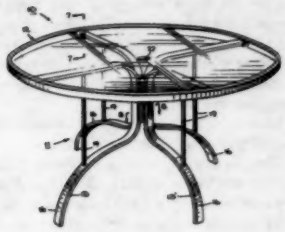
## TABLE WITH REINFORCED LEG STRUCTURE

Robert D. Vanderminden, Granville, N.Y., assignor to Telescope Casual Furniture Co., Granville, N.Y.

Continuation of Ser. No. 611,635, May 18, 1984. This application Aug. 25, 1989, Ser. No. 398,637
Int. Cl.[5] A47B *3/06*
U.S. Cl. 108—157 17 Claims

1. A table comprising
a base having a plurality of depending legs, a plurality of outwardly directed supports disposed in a common horizontal plane, a plurality of intermediate sections connecting said legs and supports and a plurality of vertical struts, each said strut extending between a respective leg and a respective support to stiffen said support; and
a tabletop mounted on said base, said tabletop including a peripheral rim defining a depending lip about said supports and means on said lip for releasably engaging with said supports to releasably lock said tabletop to said base, said means including a plurality of L-shaped brackets secured to said lip, each said bracket having a horizontal

leg engaging under a respective support and a vertical wall abutting said respective support with each support



being movable away from said vertical wall during release of said support from said tabletop.

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**4,941,414**

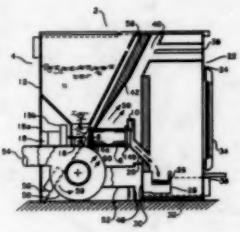
**STOVE HAVING A ROTATING FEED CYLINDER FOR PARTICULATE FUEL**

**Timothy R. Carlson, 20149-44th Ave. NE., Seattle, Wash. 98155**

**Filed Mar. 17, 1989, Ser. No. 325,266**

**Int. Cl.[5] F23K *3/10, 3/16***

**U.S. Cl. 110—108** **22 Claims**



1. In a stove having a combustion chamber, a solid particulate fuel feed system cooperating with said combustion chamber, said fuel feed system comprising:

a fuel hopper for holding solid particulate fuel;

a hollow feed cylinder disposed with its longitudinal axis lying generally horizontal and mounted for rotation about said axis, said hollow feed cylinder having an open entry end in communication with said fuel hopper and a discharge end; and

a drive means for rotating said cylinder such that solid particulate fuel in said hopper feeds into said hollow cylinder so as to form a bank of fuel sloping downwardly from said entry end to said discharge end, the solid particulate fuel traveling in said bank in said hollow cylinder and being uniformly discharged into said combustion chamber of the stove due to rotational motion of said hollow cylinder.

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**4,941,415**

**MUNICIPAL WASTE THERMAL OXIDATION SYSTEM**

**G. Michael Pope, Ottumwa, and Donald F. Kerr, Burlington, both of Iowa, assignors to Entech Corporation, Ottumwa, Iowa**

**Filed Nov. 2, 1989, Ser. No. 430,371**

**Int. Cl.[5] B09B *3/00*; F23G *7/00***

**U.S. Cl. 110—235** **10 Claims**

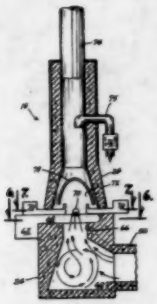
1. A municipal waste incinerator, comprising:

a primary combustion chamber for receiving waste materials to be burned to yield combustion gases;

means for transporting said combustion gases to a secondary combustion unit for re-igniting the combustion gases;

said secondary combustion unit including a chamber having a bottom feed opening for receiving the combustion gases, a top exhaust opening, and an intermediate choke and air mixing section;

an air mixing means disposed in said air mixing section for supplying outside air from a plurality of points around the periphery of the air mixing section, and being directed toward the center thereof;



means for forming a flue gas cone having an upwardly directed apex, said cone forming means including said intermediate choke and said air-mixing means; and

a plurality of re-ignition burners disposed around the periphery of said air mixing section and being disposed immediately above said air mixing means at the apex of the flue gas cone, each of said burners being disposed such that a flame extending therefrom is directed about 30° degrees off of center of the air mixing section, whereby the flames extending from the burners form a vortex to assist in the mixing and complete burning of the combustion gases before they exit the top exhaust opening.

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**4,941,416**

**ACTUATING MECHANISM FOR A GROUND-ENGAGING TOOL**

**Frank W. Faulring, 4841 Genesee Rd., North Collins, N.Y. 14111**

**Filed Dec. 1, 1988, Ser. No. 278,673**

**Int. Cl.[5] A01C *11/02*; A01B *49/04***

**U.S. Cl. 111—102** **21 Claims**

1. An actuating mechanism for controlling the movement of a tool which is adapted to selectively engage the ground while being translated therealong, comprising:

a frame adapted to be translated along the ground at a ground speed;

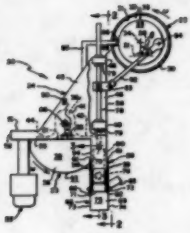
a cam mounted on said frame for rotational movement about a first axis, said cam having a cam surface configured as a surface of revolution generated about a second axis positioned eccentrically with respect to said first axis;

a link having a first marginal end portion mounted on said frame for rotational movement about a third axis and having a second marginal end portion;

a member mounted on said link second marginal end portion for rotational movement about a fourth axis, said member having a follower arranged to engage said cam surface, said cam and link means being so oriented and arranged with respect to one another that a line between said first and second axes will be substantially equal in length and parallel to a line between said third and fourth axes so as to maintain the spatial orientation of said member as said cam and link rotate about their respective rotational axes with said frame, said member having a horizontal velocity component which is sinusoidal and having a vertical ve-

locity component which is also sinusoidal but which is substantially 90 degrees out-of-phase with respect to said horizontal component, said member also carrying a tool; and

motor means for rotating at least one of said cam and link means about its rotational axis with said frame in an angular direction and at an angular speed such that, when said



member is in the vicinity of its bottom dead center position, the horizontal velocity component of said member will be of such magnitude and direction as to substantially cancel the ground speed of said frame;

whereby said tool may be selectively lowered to engage the ground at a substantially-zero net horizontal speed relative thereto.

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**4,941,417**

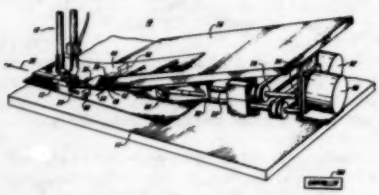
**FULL FELLED SEAM FOLD ASSEMBLY**

**Mitchell L. Hansberry, Framingham, Mass., assignor to The Charles Stark Draper Laboratory, Inc., Cambridge, Mass.**

**Filed Mar. 3, 1989, Ser. No. 319,120**

**Int. Cl.[5] D05B *35/02***

**U.S. Cl. 112—142** **11 Claims**



1. Seam forming apparatus for forming a full felled seam at one lateral edge of each of two limp material segments, comprising:

a fold assembly extending along a reference axis from an input end of said assembly to an output end of said assembly, and including:

A. a rigid central member extending along said reference axis and having a substantially Z-shaped cross-section at said output end and having a substantially I-shaped cross-section at said input end, said Z-shaped cross-section being substantially symmetrically disposed about said reference axis, and said central member having a substantially continuously decreasing Z-shaped cross-section between said output end and said input end,

B. a rigid upper guide member having an inner surface with a substantially V-shaped cross-section,

C. means for positioning said rigid upper guide member adjacent to the upper surface of said central member, whereby said inner surface of said upper guide member is disposed near said output end of said central member and opposed to and offset from the upper vertex of said Z-shaped portion of said central member, thereby forming a segment guide channel,

D. a rigid lower guide member having an inner surface with a substantially V-shaped cross-section, and

E. means for positioning said rigid lower guide member adjacent to the lower surface of said central member, whereby said inner surface of said lower guide member is disposed near said output end of said central member and opposed to and offset from the lower vertex of said Z-shaped portion of said central member, thereby forming a segment guide channel.

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**4,941,418**

**SEWING INSTALLATION FOR FABRIC ARTICLES**

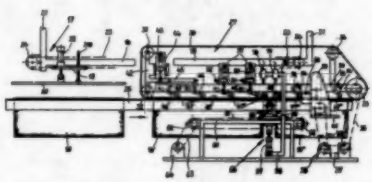
**Siegfried Henze, Saal/Saale; Hans Ziegler, Grossbardorf, and Martin Schnaus, Bad Königshofen, all of Fed. Rep. of Germany, assignors to Texpa Arbter Maschinenbau GmbH, Fed. Rep. of Germany**

**Filed Nov. 4, 1988, Ser. No. 267,331**

**Claims priority, application Fed. Rep. of Germany, Nov. 4, 1987, 3737369**

**Int. Cl.[5] D05B *27/12***

**U.S. Cl. 112—304** **8 Claims**



1. Sewing installation for fabric articles, comprising a first material handling means for the fabric articles drawn from a stockpile, which transfers the fabric articles to a second material handling means having endless conveyor belts with bottom drums, a lifting means for raising the conveyor belts for an introduction of the fabric articles over a portion of their length and for lowering the conveyor belts for a pick-up and further conveyance of the fabric articles to at least one sewing machine, the lifting device having movable lifting elements which have means to engage from below in turn on the bottom drums of the conveyor belts, the improvement wherein:

(a) the lifting elements (56) have means to be driven back and forth substantially parallel to the conveyor belts (30) of the second material handling means (27), and can be driven in a direction of conveyance in a raised state and in an opposite direction in a lowered state,

(b) the raising and lowering movement of the conveyor belts (30) of the second material handling means (27) as well as the raising and lowering movement and the back and forth movement of the lifting elements (56) are controlled by means of following scanning elements (70, 71), which detect ends and beginnings of fabric articles (10) which are in series one following another, and

(c) the conveyor belts (30) of the second material handling means (27) have means to circulate continuously in the raised and lowered state.

4,941,419

## CATAMARAN BOAT STRUCTURE

Dario Corti, Corso Venezia, 12, 20122 Milano, Italy

Filed Apr. 25, 1989, Ser. No. 342,754
Claims priority, application Italy, Apr. 29, 1988, 20370 A/88
Int. Cl.[5] B63B *1/00*
U.S. Cl. 114—61 7 Claims

1. A motorboat of the cataraman type comprising two tubular elements of substantially cylindrical shape, tapering at respective end portions thereof, made of an elastomeric material and arranged with a parallel and symmetrical relationship with respect to a longitudinal axis of the motorboat and coupled and spaced by a deck forming a bottom of a top dead structure, at a bottom portion of each tubular element there being coupled a rigid elongated hull extending substantially along said tubular element and consisting of at least a portion of a hollow section member having a closed loop cross section, the deck delimiting a top portion of a tunnel formed by the motorboat with the surface of the water being longitudinally shaped so that the height of the tunnel, having a gradually varying height from the boat bow to the boat stern, assumes a minimum value at the rear ends of the hulls, wherein said deck comprises, starting from the motorboat bow, a first positive slope portion which forms with a parallel line to the floating line passing through the front end of the deck an angle from about 0° to 5° for a length equal to about 10 to 15% of the overall length of said motorboat, meeting with a central region with a first portion of substantially zero slope followed by a portion having a slope from 0° to −5°, and a penultimate portion of greater positive slope from about 5° to 45° to arrive at the lowermost point of the deck bottom therefrom the slope becomes negative again, from 0° to 5°, at the terminal end portion, an optimum angle between the line coupling the lowermost point of the deck to the end point of the first portion and the floating line varying from 1° to 6°.

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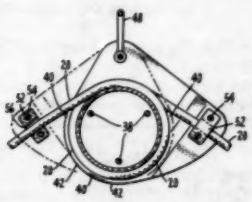
4,941,420

## SAILBOAT ROOM CONTROL DEVICE

Harold L. Heintz, 8422 New York Dr., Stockton, Calif.

Filed Feb. 16, 1989, Ser. No. 310,948
Int. Cl.[5] B63H *9/04*
U.S. Cl. 114—102 1 Claim



1. A device for controlling the swinging movement of the main boom on a sailboat, said device comprising,

(a) a clindrical hollow drum having a smooth outer surface to receive a coil of rope,

(b) a pair of spaced, substantially parallel plates secured to the ends of the drum and overlapping the outer surface of the drum to form end walls for confining a coil of rope on the outer surface of the drum,

(c) each of said plates being substantially triangular in shape and having a curved edge portion concentric to the outer surface of the drum,

(d) each of said plates also having first and second extensions with end portions spaced closely adjacent to, but beyond, the circumference of the drum when wrapped with a coil of rope,

(e) said first extensions on the plates disposed opposite each other and provided with means for pivotally attaching the device to the main boom for the sailboat,

(f) said second extensions on the plates being disposed in oposite directions to each other and each terminating in an offset segment, and

(g) rope guides mounted on said offset segments positioned tangentially to the cylindrical outer surface of the drum whereby a coil of rope can pass freely therethrough so as to be laid in a neat wrap on the outer surface of the drum.

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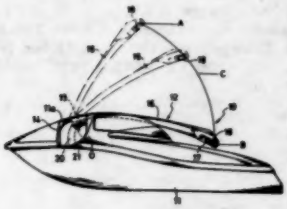
4,941,421

## STEERING MECHANISM FOR AQUATIC VEHICLE

Ron L. Anderson, Irvine, Calif., assignor to Suzuki Jidosha Kogyo Kabushiki Kaisha, Japan

Filed Sep. 23, 1988, Ser. No. 248,369
Int. Cl.[5] B63H *25/02*
U.S. Cl. 114—144 R 11 Claims



1. A steering mechanism for an aquatic vehicle having a hull comprising:

a stationary housing secured to the hull on a deckside thereof;

a movable housing movable relative to said stationary housing;

a steering pole having one end as a base end secured to said movable housing and the other end as a free end to which a handle member is secured;

guide means disposed on said surfaces of either one of said stationary housing and said movable housing; and

a movable mechanism disposed on the other one of said stationary housing and said movable housing and engageable with said guide means and movable therealong, said movable mechanism comprising a plurality of rollers in rolling engagement with said guide means and rollable therealong.

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4,941,422

## HATCH VENTILATOR AWNING FOR BOATS

Marshall K. Muller, 969 Mayo Rd., Edgewater, Md. 21037

Filed May 25, 1989, Ser. No. 356,769
Int. Cl.[5] B63B *19/28*
U.S. Cl. 114—203 8 Claims

1. Hatch ventilator awning for a boat, comprising:

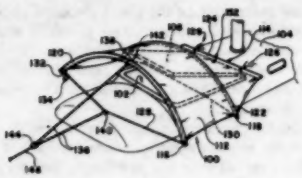
(a) sheet of water-proof material, which can be positioned over a hatch opening of said boat;

(b) first attachment means comprising one end of said sheet (a), said attachment means being adapted to be attached to said boat so as to position said sheet (a) over said boat hatch opening;

(c) flexible means comprising the other end of sheet (a), said flexible means being capable of being forced into a flexed

position whereby at least the portion of said sheet (a) located by said other end of sheet (a) is formed into a curve facing towards said boat hatch;

(d) connection means whereby said flexible means (c) can be forced into said flexed position;



(e) second attachment means which is attached to said connection means (d) and to said flexible means (c); and

(f) third attachment means which is attached to said second attachment means (e) and which is adapted to be attached to said boat at a position away from said hatch.

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**4,941,423**

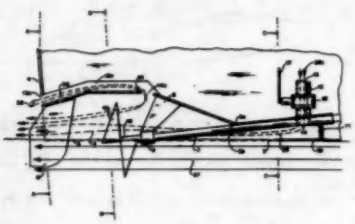
## MARINE PROPULSION SYSTEM

**Gary W. Van Tassel, Lusby, Md., assignor to Ocean Tech Marine, Inc., North Bergen, N.J.**

**Continuation-in-part of Ser. No. 874,568, Jun. 16, 1986, abandoned. This application Oct. 13, 1987, Ser. No. 108,582**

**Int. Cl.[5] B63H *5/16***

**U.S. Cl. 114—289** **80 Claims**



1. An improved propulsion system for a powerboat of the type having a tunnel located on the exterior of the hull of the powerboat and a surface-piercing propeller within the tunnel, means for drawing air from the exterior of the powerboat by means other than the tunnel and conveying it to the tunnel, and means for admitting said air to the tunnel forward of the propeller, the improvement wherein:

the tunnel is of semi-circular cross-section in the vicinity of the propeller;

the radius of the tunnel in the vicinity of the propeller provides running clearance for the propeller;

the said semi-circular cross-sectional area of the tunnel in the vicinity of the propeller blends smoothly into the area of the tunnel located forwards and rearwards of the vicinity of the propeller;

the area of the tunnel located rearwards of the vicinity of the propeller is semi-circular in cross-section with a flattened top;

the area of the tunnel located rearwards of the vicinity of the propeller is fitted with a rudder;

the height of the tunnel rearwards of the vicinity of the propeller is constant for about one-half of the distance from the mid-point of the propeller to the transom;

the height of the tunnel in the rearward one-half of the area of the tunnel rearwards of the vicinity of the propeller gradually diminishes in a rearward direction;

the area of the tunnel forward of the vicinity of the propeller is semi-circular in cross-section, gradually changing to a rectangular cross-section at the forward end of the tunnel;

the height of the tunnel in the vicinity of the propeller is constant;

the height of the tunnel from a point forward of the vicinity of the propeller diminishes to the vicinity of the point at which the propeller shaft enters the tunnel;

the height of the tunnel forward of the point at which the propeller shaft enters the tunnel is constant;

the forward bottom underside of the tunnel consists of a flow separation plate; and

air is admitted into the tunnel by an air outlet located on the roof of the tunnel forward of the propeller.

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**4,941,424**

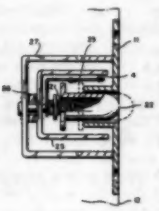
## DOOR ALARM

**Herbert Hanft, 3609 Cameron Mills Rd., Alexandria, Va. 22305**

**Filed Oct. 17, 1988, Ser. No. 258,638**

**Int. Cl.[5] G08B *13/08***

**U.S. Cl. 116—85** **5 Claims**



1. A sonic alarm device for signalling the opening of a closed door comprising:

a door hingedly mounted adjacent the edge of a door frame for swinging movement about an upright hinge axis into and out of a closed position;

said door having an exterior and an interior;

a door alarm mounted in the interior of said door;

said door alarm comprising a housing for said alarm in which said alarm is contained;

an isolator inside of said housing, said isolator supporting a sonically activated device and separating said sonically activated device from said housing;

a spring holder mounted within said isolator;

a spring mounted on said spring holder in position horizontal to the door, said spring being pushed back into the interior of said housing when the door is in a closed position, and released when the door is opened;

a plunger which is moved forward when said spring is released;

a hammer actuator which is contacted by said plunger when said door is opened;

a hammer which contacts said sonically activated device to cause said device to produce an audible sound.

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**4,941,425**

## METHOD AND DEVICE FOR TEMPERATURE INDICATION OF FROZEN PRODUCTS

**Walter Holzer, Drosteineg 19, Meersburg, Fed. Rep. of Germany**

**Filed Oct. 6, 1988, Ser. No. 254,506**

**Claims priority, application Fed. Rep. of Germany, Oct. 8, 1987, 3734054; Oct. 23, 1987, 3735890**

**Int. Cl.[5] G01K *11/06***

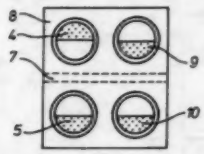
**U.S. Cl. 116—217** **14 Claims**

6. A frozen product temperature indicator comprising:

at least two transparent sealed chambers, each sealed chamber encapsulating an indicator fluid that freezes at a certain temperature, said indicator fluid partly filling said

sealed chamber and being permanently constrained within said sealed chamber wherein the indicator fluids of said sealed chambers are frozen in mutually opposing first positions in the respective chambers; and

means for placing the at least two sealed chambers in contact with the frozen product, wherein in any desired orientation of the frozen product, (i) the indicator fluid in at least one sealed chamber upon having been frozen in said first position in the chamber, during melting flows under the




influence of gravity into a second position within said at least one sealed chamber and (ii) upon melting, the relative positions of said fluids in said sealed chambers being different from said mutually opposing first positions for all orientations of said frozen product irrespective of any subsequent refreezing and rethawing of said said fluids while contact between said sealed chamber and said frozen product is maintained thereby indicating that the temperature of said frozen product has risen above the melting temperature of said indicator fluid.

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**4,941,426**

## THIN-FILM COATING APPARATUS

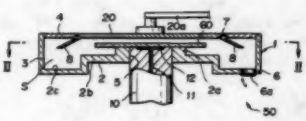
**Hiroyoshi Sago; Hideyuki Mizuki; Katsuhiko Kudo, all of Kanagawa, and Muneo Nakayama, Tokyo, all of Japan, assignors to Tokyo Ohka Kogyo Co., Ltd., Kanagawa, Japan**

**Filed Sep. 16, 1988, Ser. No. 245,464**

**Claims priority, application Japan, Sep. 18, 1987, 62-142731[U]**

**Int. Cl.[5] B05C *13/02***

**U.S. Cl. 118—52** **4 Claims**




1. An apparatus for coating a member with a thin film, comprising:

a rotatable spinner for securely supporting a plate-like member onto which a coating solution is to be dropped;

a casing surrounding said spinner to surround the member, said casing being firmly attached to said spinner and having an opening for allowing the member to be taken into and out of said casing;

a lid for closing said opening of said casing to define a closed processing chamber in said casing when the member and said casing rotate in unison with each other for spreading the coating solution which has been dropped on the member over the member;

said casing comprising a bottom member firmly attached to said spinner, a sidewall joined to an outer periphery of said bottom member, and an upper wall coupled to an upper peripheral edge of said sidewall, said opening being defined in said upper wall, said bottom member and said sidewall jointly defining an annular channel in said processing chamber and said annular channel having a drain port;

a guide plate attached to and extending fully along a lower edge of said upper wall defining said opening, said guide plate projecting downwardly and radially outwardly, and said guide plate being positioned so as to be located laterally of the plate-like member and having a lower edge vertically aligned with said annular channel;

said lid having a seal attached to a lower surface thereof and extending fully along a peripheral edge of said lid for hermetically contacting the entire periphery of said opening; and

an arm, said lid being rotatably supported on said arm for rotation in unison with said casing.

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**4,941,427**

## SPRAY BOOTH

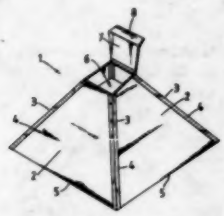
**Vazgen J. Houssian, Union City, N.J., assignor to Esselte Pendaflex Corporation, Garden City, N.Y.**

**Filed Sep. 20, 1988, Ser. No. 246,990**

**Claims priority, application United Kingdom, Sep. 24, 1987, 8722517**

**Int. Cl.[5] B05B *15/12***

**U.S. Cl. 118—326** **9 Claims**




1. A spray booth, comprising a collapsible hollow pyramid having a plurality of faces, a base, and a truncated vertex defining an opening, closure means for closing said opening, means for collapsing said pyramid into a substantially flat form, said collapsing means including flexible joints between said faces, said truncated vertex having sides which define said opening, said sides defining a plane which is inclined relative to a plane of the base of the pyramid.

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**4,941,428**

## COMPUTER CONTROLLED VISCOUS MATERIAL DEPOSITION APPARATUS

**Harold J. Engel, 18932 Olympia St., Northridge, Calif. 91326**

**Continuation of Ser. No. 75,571, Jul. 20, 1987, abandoned. This application Jan. 30, 1989, Ser. No. 303,077**

**Int. Cl.[5] B05C *5/02***

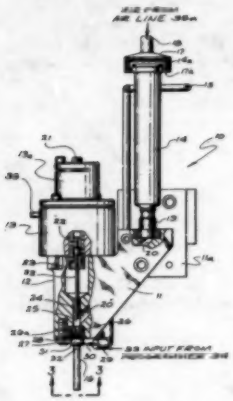
**U.S. Cl. 118—680** **10 Claims**

1. Apparatus for successive deposition of viscous fluid quantities on a planar surface at each of a corresponding succession of X Y coordinate locations on said surface, said apparatus comprising:

a positionable carriage and a plurality of hollow needle elements mounted on said carriage, each of said needle elements having an orifice directed to deposit said viscous fluid onto said surface from corresponding points of optimum Z axis clearance with respect to said surface, said plural hollow needle elements extending substantially mutually parallel and normal to said surface, said needle elements further being mounted to be rotatable in a plane parallel to said planar surface;

first means for successively positioning said carriage and therefore said needle elements for a corresponding dwell time in a succession of X,Y,Z positions with respect to said

surface, said first means also including means for rotating said needle elements for discretely determining the pattern



of the corresponding plural depositions of said fluid on said surface during each of said dwell times.

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**4,941,429**

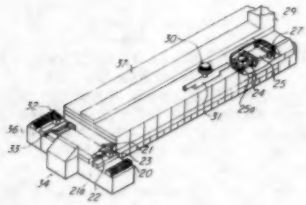
**SEMICONDUCTOR WAFER CARRIER GUIDE TRACKS**

**Thomas F. Wilkinson, Kaoru Ishii, both of Garland, Tex., assignor to Texas Instruments Incorporated, Dallas, Tex.**

**Filed Dec. 20, 1988, Ser. No. 287,106**

**Int. Cl.[5] C23C *16/00***

**U.S. Cl. 118—715** **17 Claims**



1. A semiconductor carrier and track system for transporting semiconductor wafers through a reactor system comprising the combination of:

a plurality of interconnected reaction chambers;

a semiconductor wafer carrier having grooves along two sides of the carrier; and

a pair of guide tracks extending through said reaction chambers, spaced to accept said grooves along two sides of said semiconductor wafer carrier;

wherein, said guide tracks are removably mounted in said reaction chambers and said semiconductor wafer carrier is movable through said reaction chambers along said guide tracks.

**4,941,430**

**APPARATUS FOR FORMING REACTIVE DEPOSITION FILM**

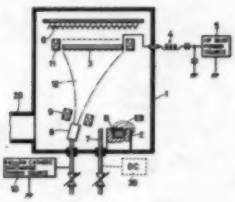
**Kazuhiro Watanabe; Kazuya Saito; Yoshiyuki Yuchi, and Konosuke Inagawa, all of Ibaragi, Japan, assignors to Nihon Sinku Gijutsu Kabusiki Kaisha, Chigasaki, Japan**

**Filed Apr. 25, 1988, Ser. No. 185,863**

**Claims priority, application Japan, May 1, 1987, 62-106427**

**Int. Cl.[5] C23C *16/50***

**U.S. Cl. 118—723** **16 Claims**



2. An apparatus for forming a reactive deposition film comprising:

(A) means for supporting a body to be coated in a vacuum chamber;

(B) an evaporation source of element or elements constituting said reactive deposition film;

(C) means for introducing a reaction gas into said vacuum chamber;

(D) a first bias means for applying a high frequency or radio frequency (rf) bias voltage to said body;

(E) a second bias means for applying a DC (direct current) bias voltage or AC (alternate current) bias voltage to said gas introducing means for activating said reaction gas;

(F) an electron beam generator for supplying electron beams towards said body; and

(G) a magnetic field generator which generates such a magnetic field that distributes said electron beams supplied from said electron beam generator uniformly to the whole region adjacent to the surface of said body and traps electrons from said electron beams in said region, whereby plasma of high density can be formed uniformly in the whole region adjacent to the surface of said body.

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**4,941,431**

**SYSTEM FOR HANDLING LABORATORY ANIMALS**

**Francis G. Anderson, deceased, late of Moyock, and by Dorothy S. Anderson, executor, Rte. 2, Box No. 93M, Baxter Estates, Moyock, both of N.C. 27958**

**Filed Dec. 14, 1988, Ser. No. 284,095**

**Int. Cl.[5] A01K *29/00***

**U.S. Cl. 119—1** **18 Claims**

1. A method of handling laboratory animals used for performing tests comprising the steps of:

providing at least one animal compartment dimensioned to accommodate at least one laboratory animal therein, said compartment having a bottom panel which is imperforate within a given perimeter, and upstanding side panels around the perimeter of said imperforate bottom panel to define an enclosure for the animal, said enclosure having an upper opening;

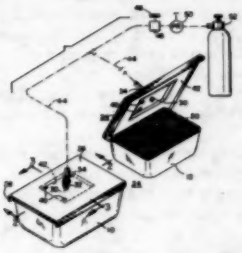
depositing a living animal having a respiratory system in said enclosure;

providing life support to said animal through said upper opening and performing laboratory tests by treating said animal while in said enclosure so as to obtain test results;

thereafter providing a closure for said upper opening and introducing $CO_2$ into enclosure through said closure and mixing the $CO_2$ with the air in the enclosure to provide

first a concentration of $CO_2$ sufficient to anesthetize the animal;

mainting the flow of said $CO_2$ for a time period to produce a selected volume of $CO_2$ sufficient to fill the bottom of said enclosure with a second concentration of $CO_2$ to a level higher than the height of the animal's respiratory system; and



restricting the exhaust of any gaseous medium from the enclosure, thereby maintaining the level of said concentration of $CO_2$ in said enclosure for a time period to subject said animal to the asphyxiating effect of said $CO_2$ concentration.

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**4,941,432**

## FISH PROTECTION SYSTEM

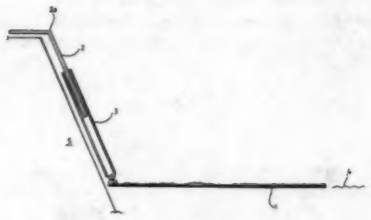
**Patrick F. Ferrari, 25 Hazel Rd., Dartford, Kent, England**

**Filed Jul. 3, 1989, Ser. No. 374,950**

**Claims priority, application United Kingdom, Jul. 18, 1988, 8817028**

**Int. Cl.[5] A01K *63/00***

**U.S. Cl. 119—3** **15 Claims**



1. A fish protection system comprising a plurality of guard plates, and support means for supporting the guard plates on the surround of a fish pond so as to position the guard plates around the perimeter of the pond at the water level, wherein the support means is such that any given guard plate will tilt downwardly if subjected to a downwards force of a predetermined magnitude.

**4,941,433**

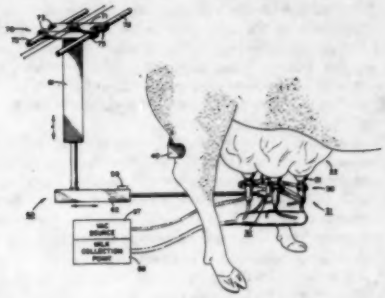
## MILKING METHOD AND RELATED APPARATUS

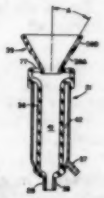
**George E. Hansuer, Brookfield, Conn., assignor to Agri-Automation Company, Ltd., Brookfield, Conn.**

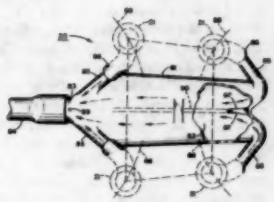
**Filed May 23, 1988, Ser. No. 197,951**

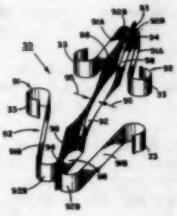
**Int. Cl.[5] A01J *5/00***

**U.S. Cl. 119—14.02** **45 Claims**









1. An automatic milking unit positioning device mounted on a base at the udder end of a dairy cow milking station, comprising:

A. an attacher presented toward the udder of a cow to be milked,

B. manipulator actuation means movably mounted on said base for moving the attacher between a milking position under a cow's udder and a retracted position,

C. resilient cup support means incorporated in said attacher,

D. four teat cups adjustably mounted in a trapezoidal pattern in the resilient support means, each having a rigid shell enclosing a flexible internal teat-receiving inflation tube pulsingly expandable and contractable by external pressure or partial vacuum, surmounted by an upwardly open thin-walled flexible conical entrance portal facing a teat,

E. a milk receiving claw manifold having an outlet port and

four inlet nipples each connected by flexible conduit means to the lower end of the inflation tube of one of said teat cups,

F. delivery conduit means connected to said outlet port for receiving and delivering milk from the outlet port of the claw manifold to a collection point,

G. a controllable vacuum source for connection to the delivery conduit means, reducing pressure inside the claw manifold and the lower end of the inflation tube for delivering milk to the collection point, and for intermittent pulsing connection to the region inside the shell surrounding the inflation tube, producing pulsing milking expansion and contraction of the inflation tube,

H. sensing means responsive to the positions of the teat cups and the cow's udder,

I. and control circuitry means operatively connected to the sensing means, actuating the vacuum source for automatic engagement of the teat cups on the cow's udder, automatic pulsing milking action of the inflation tubes, and automatic collection of the milk delivered therefrom via the claw manifold, and automatic disengagement when the milking operation is completed.

**18.** An automatic milking unit positioning device for attaching milking machines to dairy cows in a plurality of adjacent milking stations, comprising:

A. track means joining a plurality of milking stations each adjacent to one of a corresponding plurality of stalls accommodating cows to be milked,

B. a travelling robotic manipulator movably mounted on said track means for movement between said milking stations, and having an attacher presented toward the udder of cow to be milked, and actuation means for moving the attacher between a milking position under a cow's udder and a retracted position,

C. resilient support means incorporated in said attacher,

D. four teat cups adjustably mounted in a trapezoidal pattern in the resilient support means, each having a rigid shell enclosing a flexible internal teat-receiving inflation tube pulsingly expandable and contractable by external pressure or partial vacuum, surmounted by an upwardly open thin-walled flexible conical entrance portal facing a teat,

E. a milk receiving claw manifold having an outlet port and four inlet nipples each connected by flexible conduit means to the lower end of the inflation tube of one of said teat cups,

F. delivery conduit means connected to said outlet port for receiving and delivering milk from the outlet port of the claw manifold to a collection point.

G. a controllable vacuum source for connection to the delivery conduit means, reducing pressure inside the claw manifold and the lower end of the inflation tube for delivering milk to the collection point, and for intermittent pulsing connection to the region inside the shell surrounding the inflation tube, producing pulsing milking expansion and contraction of the inflation tube,

H. sensing means responsive to the positions of the manipulator and the teat cup cluster and the cow's udder,

I. and control circuitry means operatively connected to the sensing means and to the manipulator, actuating the manipulator and the vacuum source for automatic engagement of the teat cups on the cow's udder, automatic pulsing milking action of the inflation tubes, and automatic collection of the milk delivered therefrom via the claw manifold, and automatic disengagement when the milking operation is completed.

**29.** A teat cup attaching means adapted for deployment under the udder of a cow to be milked, and capable of presenting four upright teat cups for engagement on the cow's udder, comprising:

A. a central longitudinal support bar extending forward and rearward beyond both ends of the normal trapezoidal array of teats on the cow's udder,

B. a pair of forward support members extending from the forward end of the support bar diagonally rearward and laterally outward, each terminating in a teat cup retaining means,

C. a pair of rear support members extending from the rear end of the support bar diagonally forward and laterally outward, each terminating in a teat cup retaining means,

D. the support members being relatively rigid vertically to resist downward deflection while simultaneously being relatively flexible laterally to permit lateral deflection,

whereby the four teat cups are retained in a cluster at the apices of a generally horizontal trapezoid

**38.** A claw manifold for incorporation in a milking machine for collecting milk received by four teat cups via hoses and delivering it through an outlet port via a delivery conduit to a collection point, comprising:

A. a hollow claw housing enclosing a manifold chamber drained through said outlet port at one end of said chamber,

B. a first pair of nipples, each connected by one said hose to a teat cup, opening into said chamber near said outlet port and oriented to deliver arriving milk streams along angularly converging streamlines toward said outlet port,

C a second pair of nipples, each connected by one said hose to a teat cup, opening into said chamber at its opposite end and oriented to deliver arriving milk streams along streamlines angularly converging toward said opposite end,

D. and milk stream deflecting surface means formed in said opposite chamber end receiving the converging milk streams and re-directing them toward said outlet port,

whereby all four arriving milk streams converge at the outlet port in substantially streamline non-turbulent flow, minimizing foaming and turbulence in the milk collected by the claw manifold.

**44.** A method for simultaneously attaching a plurality of milking machine teat cups having upstanding conical entrance portals to the udder of a dairy cow restrained at a milking station, comprising the steps of:

A. positioning the teat cups in a trapezoidal configuration free for lateral and longitudinal movement in a substantially horizontal plane while resisting displacement in vertical directions,

B. connecting the teat cups to a vacuum source and to a milk collection point,

C. raising the plurality of teat cups simultaneously to bring the teat cups into engagement with the cow's teats,

D. while simultaneously actuating the vacuum source to draw the teat cups into engagement on respective teats, guided by the conical entrance portals slidingly co-acting with the teats and horizontally deflecting the teat cups,

whereby individual manual attachment of each teat cup is avoided by simultaneous elevating self-guided movement of all teat cups into attached position ready for automatic milking to begin.

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**4,941,434**

## QUICK CONNECT RETAINING LEASH

**Phillip Ellwanger, 910 Spring St., Petoskey, Mich. 49770**

**Filed Aug. 11, 1988, Ser. No. 230,865**

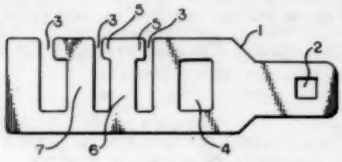
**Int. Cl.**[5] **A01K** *27/00*

**U.S. Cl. 119—109** **7 Claims**

**1.** A locking plate leash holder comprising essentially of an elongated

flat member of essentially rectangular shape and having at least one planar surface, having on one end, a configuration detachedly lockable into an automotive seat safety belt keeper member, and on the opposite end, a series of open sided slots through theat least one planar surface and perpendicular to the long axis of the elongated single flat

member and, intermediate the open slots and the lockable configuration, a perforation through the at least one planar surface of the elongated single flat member to accomodate the insertion therethrough of a leash.

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**4,941,435**

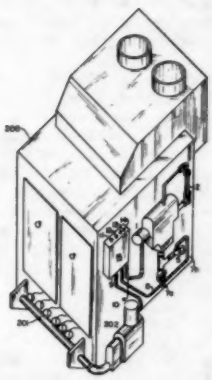
## METHOD AND APPARATUS FOR PREVENTING LOW-WATER FAILURE IN BOILERS

**Thomas C. Person, 3205 Natural Bridge, St. Louis, Mo. 63107**

**Filed Jun. 23, 1989, Ser. No. 370,984**

**Int. Cl.[5] F22B *37/54***

**U.S. Cl. 122—382** **2 Claims**



1. An improved method for preventing low-water failure in boilers comprising:

(a.) periodic blow down of feed water from the bottom of a low-water cut-off control valve during the water feed cycle for from one second to the entire period of the feed cycle;

(b.) shutting off the blow down after an effective period of time;

(c.) monitoring the temperature of the boiler jacket by an external temperature sensor; and

(d.) automatically shutting off the burners of the boiler when the sensor senses any temperature above a predetermined danger point.

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**4,941,436**

## COOLING SYSTEM FOR I.C.E. VALVE SEAT INSERTS

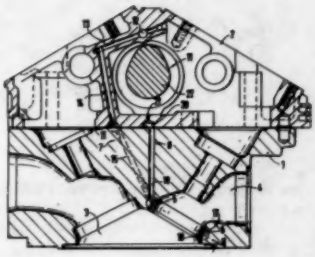
**Michael Beer, Wimsheim; Philipp Schimko, Gesigheim; August Hofbauer, Pforzheim, and Matthias Kröner, Denkendorf, all of Fed. Rep. of Germany, assignors to Dr. Ing. h.c.F. Porsche AG, Fed. Rep. of Germany**

**Filed Aug. 30, 1989, Ser. No. 400,681**

**Claims priority, application Fed. Rep. of Germany, Aug. 30, 1988, 3829339**

**Int. Cl.[5] F01P *3/14***

**U.S. Cl. 123—41.77** **14 Claims**



1. A cooling system for valve seat inserts arranged in a cylinder head of an air-cooled internal-combustion engine, comprising:

one ring duct respectively for the flowing-through of lubricating oil and surrounding the valve seat inserts,

another oil duct which supplies bearing points of a camshaft with lubricating oil and which extends in parallel to the camshaft in a camshaft housing arranged above a cylinder head,

one feed pipe which leads from the oil duct to the ring duct, and

a discharge pipe which leads from the ring duct into the camshaft housing,

wherein the one feed and the discharge pipe lead into each ring duct in closely adjacent openings,

wherein an outlet opening of the discharge pipe in the camshaft housing is arranged in direct proximity of cams, and

wherein the ring duct has a projection between the two openings which narrows it down considerably to direct flow of oil around the valve seat insert.

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**4,941,437**

## AUTOMOTIVE RADIATOR COOLING SYSTEM

**Yasushi Suzuki, Chiryu; Yasuo Takahara, Anjo; Atusi Masui, Kariya; Toshihiro Ohshima; Fumihiro Takeuchi, both of Nagoya; Toshiki Sugiyama, Obu, and Tadashi Setoguchi, Kariya, all of Japan, assignors to Nippondenso Co., Ltd. and Toyota Jidosha Kabushiki Kaisha, both of, Japan**

**Filed Jun. 21, 1988, Ser. No. 209,636**

**Claims priority, application Japan, Jul. 1, 1987, 62-164166; Jul. 10, 1987, 62-173468**

**Int. Cl.[5] F01P *7/02***

**U.S. Cl. 123—41.12** **3 Claims**

1. An automotive radiator cooling system comprising:

a cooling fan operative to direct cooling air to an automotive radiator;

a hydraulic circuit;

a hydraulic pump disposed in said circuit and driven by an external power to circulate a pressurized hydraulic fluid through said circuit;

a hydraulic motor drivingly connected to said cooling fan and disposed in said circuit so that said motor is hydraulically driven to rotate said cooling fan;

a reservoir connected to said circuit downstream of said hydraulic motor to receive the hydraulic fluid flowing out of said hydraulic motor;

a bypass line extending in bypassing relationship to said hydraulic motor and communicated at one end with a part of said circuit adjacent to an inlet of said hydraulic motor and at the other end with said reservoir; and

a check valve means operative to permit a flow of the hydraulic fluid from said reservoir through said bypass line back into said part of said circuit only when the pressure in said part of said circuit is lowered beyond a predetermined level, thereby preventing the occurrence of cavitation when the hydraulic pump is stopped while the fan is rotating at high speed;

wherein said hydraulic motor includes a housing, a shaft having an end drivingly connected to said cooling fan and rotatably mounted in said housing, and a shaft sealing means associated with said shaft to cooperate therewith and with said housing to define an oil chamber; and

wherein said bypass line is formed in said housing of the hydraulic motor and includes said oil chamber.

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**4,941,438**

**HYDRAULIC VALVE-LASH ADJUSTER**

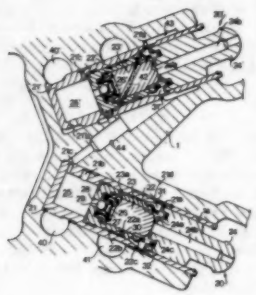
**Naoto Muto, Kawasaki, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 23, 1989, Ser. No. 425,802**

**Claims priority, application Japan, Oct. 29, 1988, 63-142186[U]**

**Int. Cl.[5] F01L *1/24***

**U.S. Cl. 123—90.46** **3 Claims**



1. A hydraulic valve-lash adjuster for an engine with a valve mechanism having at least one valve and one rocker arm, comprising:

a cylindrical reservoir case provided in a cylinder head of the engine;

a cylindrical body secured in the reservoir case to form a reservoir chamber between a bottom of the reservoir case and an outside of a bottom of the cylindrical body;

a plunger slidably mounted in the cylindrical body to form a high pressure chamber between an inside of a bottom of the cylindrical body and a bottom of the plunger;

a spring provided in the high pressure chamber so as to push the plunger;

a check valve provided in the high pressure chamber so as to keep pressure of oil in the high pressure chamber;

a pivot slidably mounted in the reservoir case so as to engage with the rocker arm;

a helper spring provided between the plunger and the pivot; and

first passage means for supplying oil to the reservoir chamber and the high pressure chamber.

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**4,941,439**

**COMBUSTION CHAMBER SURFACES OF AN INTERNAL COMBUSTION ENGINE**

**Jan Wicén, Almunge, Sweden, assignor to Oktan AB, Stockholm, Sweden**

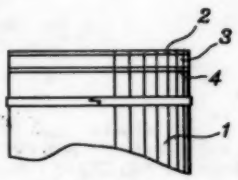
**PCT No. PCT/SE88/00235, § 371 Date Oct. 23, 1989, § 102(e) Date Oct. 23, 1989, PCT Pub. No. WO88/08926, PCT Pub. Date Nov. 17, 1988**

**PCT Filed May 5, 1988, Ser. No. 424,277**

**Claims priority, application Sweden, May 8, 1987, 8701913**

**Int. Cl.[5] F02B *77/02***

**U.S. Cl. 123—193 P** **12 Claims**



1. An arrangement in combustion chamber surfaces of an internal combustion engine, comprising:

a thin surface layer provided at least partially on the combustion chamber surfaces of the engine, and which will influence the octane/cetane rating requirement of the engine in a manner to limit the knocking tendency of the engine;

said thin surface layer (2) comprising a material of low reflectivity and high absorptivity in respect of electromagnetic waves having a wavelength of up to at least 7 μm, and high emissivity at wavelengths longer than 7 μm; and

a further layer (3) located beneath said thin surface layer (2) for accumulating heat given off by said thin surface layer (2) during a process of fuel combustion in the engine so as to counteract a rise in temperature of said thin surface layer (2) and to heat said thin surface layer (2) during a part of the combustion cycle in which the temperature in the combustion chamber is lower that the temperature of said thin surface layer (2).

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**4,941,440**

**ENGINE INCLUDING A PISTON MEMBER HAVING A HIGH TOP RING GROOVE**

**Robert L. Weber, Lacon; Kenneth R. Kamman, Edelstein; Benny Ballheimer, and Stephen G. Shoup, both of Peoria, all of Ill., assignors to Caterpillar Inc., Peoria, Ill.**

**Continuation of Ser. No. 261,664, Oct. 21, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 391,647**

**Int. Cl.[5] F02F *3/00***

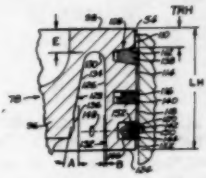
**U.S. Cl. 123—193 P** **10 Claims**

1. An engine of the type having a block defining an upper bore, a cylinder liner located in the block bore and defining a piston bore, a cylinder head connected to the block, and a piston assembly including a steel piston member disposed for reciprocation in the piston bore, wherein the improvement comprises:

the steel piston member having an upper portion of substantially cylindrical shape and a preselected diameter D, a

peripheral top surface, a recessed crown surface, a tubular wall depending from the top surface and defining an outwardly facing top land, a top ring groove disposed a preselected minimal elevational distance TRH from the top surface and wherein the ratio TRH/D is less than 0.06, a lower end surface, and an annular inwardly facing wall surface extending upwardly from the lower end surface;

the upper portion further including an annular outwardly facing wall surface and a downwardly facing transition portion blendingly associated with the inwardly and outwardly facing wall surfaces to collectively define an annu-




lar downwardly facing cooling recess located in a juxtaposed elevational relationship with the top ring groove;

the piston member also having a lower portion including a pair of depending pin bosses blendingly associated with the cooling recess and individually defining a bore and with the bores being aligned on a common axis; and

the engine including an annular recess defined between the cylinder liner and the block that is adapted in use to receive a liquid coolant, the annular recess being located in an elevationally aligned relationship with the top ring groove when the piston is at top dead center in order to dissipate heat away from the piston member thereat.

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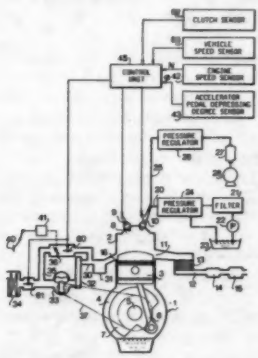
**4,941,441**

## ENGINE BRAKE SYSTEM OF A TWO-CYCLE ENGINE FOR A MOTOR VEHICLE

**Hideo Watanabe, Tokyo, Japan, assignor to Fuji Jukogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 18, 1989, Ser. No. 395,955**
**Claims priority, application Japan, Aug. 30, 1988, 63-216092**
**Int. Cl.[5] F02D *9/00***
**U.S. Cl. 123—325** **3 Claims**




1. An engine brake system of a two-cycle engine for a motor vehicle, the engine having at least one cylinder, a scavenge port, an intake passage communicated with said scavenge port, a fuel injector provided for injecting fuel in the cylinder, a scavenge pump provided in said intake passage for supplying intake air to the cylinder and a bypass provided around the scavenge pump, the system comprising:

detector means for detecting deceleration of the vehicle and for producing deceleration signal;

a valve provided in the bypass so as to close the bypass;

means responsive to the deceleration signal for closing the valve and for stopping fuel injection from the fuel injector.

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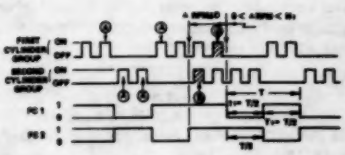
**4,941,442**

## APPARATUS FOR CONTROLLING FUEL DELIVERY TO ENGINE

**Yasutoshi Nanyoshi, and Tatsuo Morita, both of Kanagawa, Japan, assignors to Nissan Motor Co., Ltd., Japan**

**Filed May 18, 1988, Ser. No. 195,300**
**Claims priority, application Japan, May 20, 1987, 62-124714**
**Int. Cl.[5] F02D *17/02, 41/22***
**U.S. Cl. 123—333** **6 Claims**




1. An apparatus for controlling a multi-cylinder type internal combustion engine including first and second cylinder groups each including at least one cylinder, comprising:

sensor means for generating electrical signals indicative of engine operating conditions including engine speed;

a control circuit coupled to said sensor means for calculating an appropriate value repetitively at uniform intervals, the calculation being made according to engine operating conditions;

fuel supply means coupled to said control circuit for supplying fuel to said first and second cylinder groups in an amount corresponding to the calculated value;

said control circuit including means responsive to an overspeed condition for operating said fuel supply means in a fuelcut mode to alternatively terminate fuel delivery to said first cylinder group and fuel delivery to said second cylinder group, means for calculating a difference of a predetermined fuelcut speed value from an existing engine speed, and means for determining the overspeed condition when the calculated difference is greater than zero, said control circuit including means for setting a value of a first interval during which said fuel supply means operates in the fuelcut mode according to the calculated difference.

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**4,941,443**

## GOVERNOR DEVICE FOR AN ENGINE

**Fumihiro Yamaguchi; Yoshiaki Sayama, and Takao Nishida, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jan. 27, 1989, Ser. No. 304,064**
**Claims priority, application Japan, Jan. 26, 1988, 63-015627; Jan. 26, 1988, 63-015626; Jul. 22, 1988, 63-183223; Jul. 22, 1988, 63-183224; Jul. 22, 1988, 63-183225**
**Int. Cl.[5] F02D *9/10***
**U.S. Cl. 123—376** **12 Claims**

1. A governor device for an engine characterized in that it comprises:

a non-magnetic and electrically conductive disk which is rotated in synchronism with the engine;

a swing member pivotally mounted for effecting a free-swing action thereof;

a magnet mounted on said swing member and providing a

magnetic field onto said disk for inducing an electromagnetic force to effect said swing action of the swing member in responsive to the rotation of said disk;

a spring member for suppressing said swing action of said swing member in one direction; and

a drive mechanism for operating a throttle valve of the engine in opening or closing direction in responsive to the swing action of said swing member.

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**4,941,444**

## ENGINE CONTROL APPARATUS

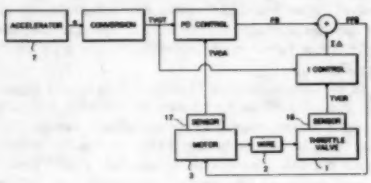
**Nagahisa Fujita, Hiroshima, Japan, assignor to Mazda Motor Company, Hiroshima, Japan**

**Filed Feb. 21, 1989, Ser. No. 313,179**

**Claims priority, application Japan, Feb. 26, 1988, 63-45475; Feb. 26, 1988, 63-45476**

**Int. Cl.[5] F02D *11/10***

**U.S. Cl. 123—399** **13 Claims**



1. An engine control apparatus comprising:

(a) an output adjusting member for adjusting an engine output, said output adjusting member being fixed so as to vibrate in accordance with an engine vibration;

(b) an actuator for driving said output adjusting member, said actuator being fixed independently and separately from the engine vibration;

(c) a linkage wire for mechanically connecting said output adjusting member and actuator;

(d) signal detection means for detecting a signal associated with a present drive position of said output adjusting member;

(e) conversion means for converting an accelerator operation amount into a signal associated with a target position of said output adjusting member;

(f) vibration detecting means for detecting the vibration of said present driving position, said vibration being caused by the engine vibration propagated to said output adjusting member through said linkage wire; and

(g) feedback control means, connected to said conversion means, signal detection means and vibration detection means, for receiving the signal associated with the present drive position and the signal associated with the target portion, calculating a feedback control signal on the basis of the signals so that said control signal may suppress the vibration of said output adjusting member, and outputting the control signal to said actuator so as to move said output adjusting member to the target position.

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**4,941,445**

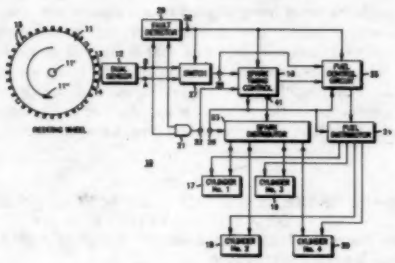
## ELECTRONIC POSITION SENSOR ASSEMBLY AND ENGINE CONTROL SYSTEM

**Robert W. Deutsch, Sugar Grove, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 194,237, May 16, 1988, abandoned. This application Nov. 2, 1989, Ser. No. 431,721**

**Int. Cl.[5] F02D *41/22*; F02P *5/15, 11/00***

**U.S. Cl. 123—414** **61 Claims**



1. An electronic position sensor assembly comprising:

a wheel rotatably driven about an axis, said wheel having thereon a plurality of predetermined portions of at least three different angular widths a, b and c, angular width a being less than angular width b which is less than angular width c;

a sensor means positioned fixed with respect to and adjacent said wheel, said sensor means having at least first and second sensing elements each independently sensing the passage of each of said predetermined portions by the sensing element and producing in response thereto a signal pulse having a duration corresponding to the angular width of said sensed predetermined portion;

said first and second sensing elements spaced apart by a dimension d corresponding to an angular width which is less than angular width c but more than angular width a and more than angular width b;

coincidence means for providing a first reference signal in response to said first and second sensing elements simultaneously producing predetermined logic state conditions of said sensor signal pulses; and

means for providing a second reference signal, different from said first reference signal, in response to one of sensing elements producing a signal pulse having a predetermined longer duration than the preceding signal pulse produced by that sensing element, whereby information as to the angular position of said wheel is obtained by at least said first and second reference signals.

**4,941,446**

## IGNITION AND FUEL INJECTION BACK-UP SYSTEM FOR EMERGENCY RUNNING OF INTERNAL COMBUSTION ENGINES

**Helmut Denz, Stuttgart; Rudolf Moz, Möglingen, and Winfried Uttenweiler, Tübingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

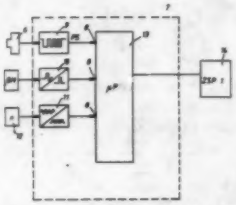
**PCT No. PCT/DE87/00398, § 371 Date Apr. 5, 1989, § 102(e) Date Apr. 5, 1989, PCT Pub. No. WO88/02817, PCT Pub. Date Apr. 21, 1988**

**PCT Filed Sep. 2, 1987, Ser. No. 347,943**

**Claims priority, application Fed. Rep. of Germany, Oct. 10, 1986, 3634587**

**Int. Cl.[5] F02P *7/00***

**U.S. Cl. 123—414** **9 Claims**



1. Ignition back-up system for emergency running or starting internal combustion engines including at least one ignition coil, comprising a computer for controlling the ignition time of the coil, a sensor cooperating with a sensor drum driven synchronously with a cam shaft of the engine, the sensor drum having cut out portions for every cylinder of the engine to generate by means of the sensor cylinder-related timing pulses which are delivered to the computer, the trailing edge of the respective timing pulses occurring at a uniform rotational angle of the crankshaft of the engine before the top dead center of the corresponding cylinders, one of the cut out portions being wider than the others to generate a wider timing pulse relative to the rest of the timing pulses, means for generating and delivering to the computer a reference pulse once per revolution of the crankshaft, the reference pulse coinciding with the wider timing pulse but being spaced apart from the rest of the timing pulses, and once per revolution of the cam shaft the computer detecting the beginning of an ignition cycle when the reference pulse occurs during the wider timing pulse or, in the absence of the reference pulse, during the wider timing pulse.

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**4,941,447**

## METERING VALVE

**Werner G. Mannhardt, Detroit, Mich., assignor to Colt Industries Inc., New York, N.Y.**

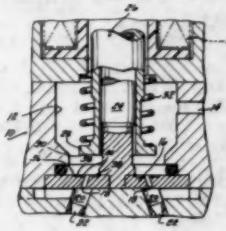
**Filed Feb. 21, 1989, Ser. No. 312,460**

**Int. Cl.[5] F02M *39/00*; F16K *31/06***

**U.S. Cl. 123—455** **9 Claims**

1. In a fuel metering valve assembly comprising housing means defining a chamber adapted to contain fuel under pressure, valve seat means on one wall of said chamber defining a valve seat surface and a plurality of outlet passage bores extending through said seat means symmetrically disposed about a central axis, valve poppet means having a poppet surface mounted in said chamber for reciprocatory movement along said axis between a valve-open position wherein said head surface is spaced from said seat surface to accommodate flow from said chamber into said bores and a valve-closed position wherein said valve poppet surface is engaged with said valve seat surface in overlying relationship with said valve seat bores to block flow from said chamber into said bores, and means for cyclically driving said valve poppet means between said open and closed positions;

the improvement wherein said valve poppet surface and said valve seat surface include opposed accurately flat planar surfaces lying in parallel planes, the planar surface of said valve seat surface having a plurality of recesses therein and a plurality of annular sealing portions constituting a portion of the planar surface of said seat surface and respectively extending around each of said valve seat bores to isolate said valve seat bores from fluid communication with said recesses and said chamber when the planar surfaces of said valve poppet means and a valve seat means are engaged with each other.



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**4,941,448**

## FUEL SUPPLY CONTROL SYSTEM FOR INTERNAL COMBUSTION ENGINE WITH IMPROVED RESPONSE CHARACTERISTICS TO VARIATION OF INDUCTION AIR PRESSURE

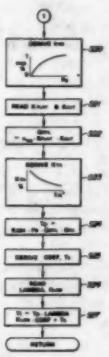
**Shinpei Nakaniwa, and Naoki Tomisawa, both of Gunma, Japan, assignors to Japan Electronic Control Systems Co., Ltd., Isezaki, Japan**

**Filed Sep. 21, 1988, Ser. No. 247,470**

**Claims priority, application Japan, Sep. 22, 1987, 62-236299**

**Int. Cl.[5] F02D *41/32***

**U.S. Cl. 123—488** **14 Claims**



1. A fuel supply control system for an internal combustion engine, comprising:

means for supplying a controlled amount of fuel to an induction system of said internal combustion engine;

means for monitoring an engine driving condition including an engine speed and an intake air pressure;

means for deriving a basic volumetric efficiency on the basis of one of said engine speed and said intake air pressure;

means for deriving a correction value for said basic volumetric efficiency on the basis of said engine speed and said intake air pressure and modifying said basic volumetric

efficiency with said correction value to derive a modified volumetric efficiency;

means for deriving a fuel supply amount on the basis of fuel supply control parameters monitored by said monitoring means and including said intake air pressure and said modified volumetric efficiency; and

means for controlling said supplying means for adjusting amount of fuel to be supplied to said induction system to the derived value.

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**4,941,449**

**FUEL INJECTION PROCESS**

**Wolfgang Höptner, Uhingen; Egbert Perenthaler, Stuttgart, and Helmut Schwarz, Vaihingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**PCT No. PCT/DE87/00281, § 371 Date Jan. 5, 1989, § 102(e) Date Jan. 5, 1989, PCT Pub. No. WO88/00287, PCT Pub. Date Jan. 14, 1988**

**PCT Filed Jan. 23, 1987, Ser. No. 301,752**

**Claims priority, application Fed. Rep. of Germany, Jul. 9, 1986, 3623042**

**Int. Cl.[5] F02D *41/36, 41/06***

**U.S. Cl. 123—490** **7 Claims**

1. Process for fuel injection in a multiple-cylinder internal combustion engine, wherein opening signals for the respective injection vales of the individual cylinders are produced as a function of the reference signals which are synchronous with the crankshaft, and all injection valves are first opened simultaneously once after the ignition is switched on and then sequential opening signals for the sequential fuel injection are produced after the synchronization has been recognized, characterized in that during starting or after a disruption of the synchronization, additional simultaneous opening signals are fed to the injection valves in a phase (a) until the synchronization is recognized, and in that the additional simultaneous opening signals are fed, after the synchronization has been recognized in a phase (b), to the injection valves of the cylinders which are not yet opened during sequential operation.

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**4,941,450**

**IGNITION DISTRIBUTOR FOR AN INTERNAL COMBUSTION ENGINE**

**Masami Matsumura; Masayuki Ikeuchi, and Shinichi Nobuto, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 11, 1988, Ser. No. 167,092**

**Claims priority, application Japan, Mar. 13, 1987, 62-37714[U]**

**Int. Cl.[5] F02P *7/03***

**U.S. Cl. 123—633** **6 Claims**

1. An ignition distributor for an internal combustion engine, comprising:

a cylindrical distributor rotor comprising a synthetic resin that is mounted on a bushing rotated synchronously with the revolution of the engine;

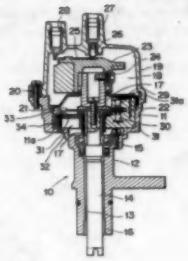
a rotor electrode radially and outwardly extending from the central portion on an upper surface of the distributor rotor;

a plurality of circumferentially disposed electrodes in the rotating locus of said distributor rotor and separated from said rotor electrode by a discharge gap;

a contact electrode contacting said rotor electrode;

a rotation angle sensor; and

a signal processing unit for processing said output signal from the rotation angle sensor, the signal processing unit being arranged coaxially with and below the distributor rotor, characterized in that the signal processing unit is



mounted directly to the distributor housing and is provided with a grounded electrically conductive shield cover mounted to the signal processing unit.

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**4,941,451**

**SOLID FUEL BURNING HEATER**

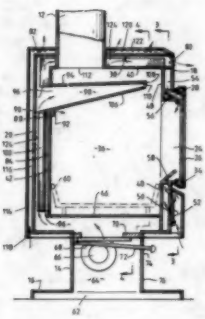
**Richard J. Gilham, 13 Swansea Road, Montrose, Victoria 3765, Australia**

**Filed Sep. 8, 1989, Ser. No. 404,677**

**Claims priority, application Australia, Sep. 19, 1988, PJ0502**

**Int. Cl.[5] F24C *1/14***

**U.S. Cl. 126—77** **9 Claims**



1. A heater comprising:

a fire box, said fire box being formed by a front wall having a door, a rear wall having a plurality of openings, two parallel side walls connecting the front walla nd the rear wall, a base, and a top having an exhaust outlet, said fire box having a primary air inlet above said door, said primary air inlet directing air downwardly past said door;

a manifold connected to the plurality of openings in said rear wall to enable secondary air to be drawn into the fire box;

a skin over said fire box positioned to form a gap between the skin and the fire box to enable air to pass between the fire box and the skin, said skin having an opening below said door of said fire box to enable primary air to be drawn into the gap, said skin having an inlet opening beneath said base to enable secondary air to be drawn into said gap; and

a baffle assembly extending inwardly from said rear wall above said plurality of openings and mounted between the side walls and intermediate between the top and the base, said baffle assembly formed from an upper baffle plate and

a lower baffle plate defining a hollow interior, said baffle assembly being open at a rear end and side ends in communication with the gap between the fire box and the skin, said baffle assembly having a plurality of holes in communication with said fire box to allow tertiary air to pass from the gap through the baffle assembly into the fire box to enable tertiary air to mix with any unburnt gases in the fire box to cause final or tertiary combustion.

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**4,941,452**

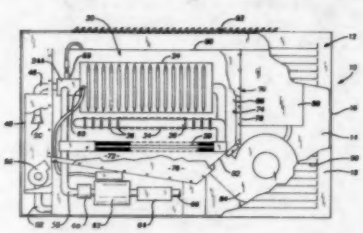
**PULSE COMBUSTION SPACE HEATER**

**William H Thrasher, North Royalton; Charles M. Pavlik, Cleveland, both of Ohio, and Larry Moon, Russellville, Ala., assignors to Gas Research Institute, Chicago, Ill.**

**Continuation of Ser. No. 320,419, Mar. 8, 1989, abandoned. This application Aug. 18, 1989, Ser. No. 396,741**

**Int. Cl.[5] F24H *3/02***

**U.S. Cl. 126—110 R** **10 Claims**



1. A pulse combustion space heater for heating air in a space to be temperature conditioned including a cabinet having exterior walls providing a cabinet volume for enclosing and supporting the heater, interior housing means located within said cabinet volume including walls providing a substantially closed heat transfer chamber having inlet and outlet openings through which air to be heated is circulated and a chamber volume substantially smaller than said cabinet volume, pulse combustion burner means including an assembly of closely spaced elongate burner elements operably connected in a fluid-tight manner for pulse combustion of a combustible gaseous mixture and discharge of combustion products to the atmosphere, said burner elements having exterior heat transfer surfaces located within said heat transfer chamber for transfer of combustion heat to air contacting the heat transfer surfaces, and blower means for circulating air from said space through said heat transfer chamber for heating by contact with said burner element assembly and then back into said space said burner element assembly having a bulk volume equal to at least about 40% of the volume of said heat transfer chamber and said blower means pressurizing said heat transfer chamber to a pressure in the range of from about 0.1 to about 0.3" W.C. to substantially eliminate localized sites of significantly different temperature in the heat transfer chamber and to reduce the tendency of said interior housing means walls to vibrate.

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**4,941,453**

**INFANT TRANSITIONAL SENSORY SYSTEM**

**Pauline V. Shakas, 1620 Lasuen Rd., Santa Barbara, Calif. 93103, and John S. Woodward, 9295 W. 73rd Pl., Arvada, Colo. 80005**

**Continuation-in-part of Ser. No. 614,717, May 29, 1984, abandoned, which is a continuation-in-part of Ser. No. 371,990, Apr. 26, 1982, abandoned. This application Jan. 28, 1986, Ser. No. 822,960**

**Int. Cl.[5] A61B *19/00***

**U.S. Cl. 600—28** **6 Claims**

1. In an infant crib or the like having a top railing surrounding the walls of a sleeping area for an infant, the improvement to provide a transitional sensory system for the infant comprising:

(a) a hammock-formable sheet of material;

(b) attachment means disposed at spaced peripheral locations about said sheet of material for attaching said sheet of material to the top railing in at least two configurations wherein one of said configurations places said sheet in a generally extended horizontal position to form a hammock-like surface upon which an infant can be placed and the other of said positions places said sheet in a position with the ends folded back upon one another to form a hanging pouch wherein an infant can be placed;

(c) heart sound simulation means for producing vibrations approximating the thump-thump characteristic heart sounds of a human heart; and,

(d) holding means attached to said sheet of material for holding said heart sound simulation means and for transmitting the vibrations produced thereby into said sheet of

material and from thence into an infant disposed on said sheet to be sensed by the infant; wherein said heart sound simulation means comprises:

a hollow case;

a solenoid coil disposed within said case;

a battery disposed within said case;

a weighted spring arm disposed within said case and attractable by a magnetic field produced by said solenoid coil, said arm being connected to said case and adapted to move from a central position to which it is biased towards said coil when attracted thereto and to a position stiking said case when no longer attracted towards said coil; and,

driver circuit means disposed within said case interruptably connected between said battery and said coil for producing periodic pairs of close-spaced pulses of current through said coil whereby said spring arm is caused to periodically strike said case twice in close-spaced succession thus producing in said case a thump-thump vibration sequence simulating characteristic human heart sounds.

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**4,941,454**

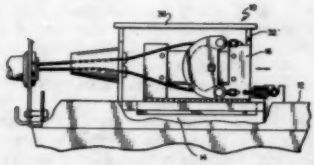
**SERVO ACTUATED STEERING MECHANISM FOR BORESCOPE OR ENDOSCOPE**

**Robert J. Wood; Earl H. Slee, both of Syracuse; Gregory E. Pasik, Auburn, and Michael J. Pileski, Warners, all of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.**

**Filed Oct. 5, 1989, Ser. No. 417,554**

**Int. Cl.[5] A61B *1/00*; G02B *7/00***

**U.S. Cl. 128—4** **11 Claims**



1. In a steerable endoscope/borescope of the type having an elongated insertion tube with a viewing head at the distal end,

a cable bendable articulation section proximally of the viewing head, and at least one pair of steering cables operatively connected to said articulation section, articulation control means comprising:

a servo motor connected to each said pair of cables,

steering control means connected to said servo motor,

actuator means connected to said steering control means including at least one variable voltage means operatively connected to increase or decrease in value as said actuator is moved in one direction of motion,

said steering control means including a pulse generating network and a pulse width modulator circuit for varying the width of generated pulses in accordance with changes in said variable voltage means;

said variations and pulse width causing said servo motor to rotate a predetermined number of degrees corresponding to the position of said actuator means, so that the bendable section of the insertion tube is actuated the desired amount.

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**4,941,455**

**ENDOSCOPE HAVING BENDING MEANS**

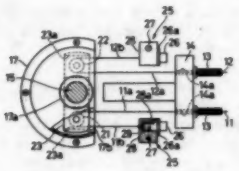
**Yoshio Watanabe, Kawaguchi, and Toshio Chikama, Tokyo, both of Japan, assignors to Kabushiki Kaisha Machida Seisakusho, Tokyo, Japan**

**Filed Sep. 14, 1989, Ser. No. 407,314**

**Claims priority, application Japan, Jul. 5, 1989, 1-171968**

**Int. Cl.[5] A61B *1/00***

**U.S. Cl. 128—4** **9 Claims**



1. An endoscope comprising:

(a) a body;

(b) a hollow insertion portion extending from said body;

(c) a hollow elongated bendable portion extending from a forward end of said insertion portion remote from said body; and

(d) means for bending said bendable portion, said bending means comprising:

(i) a pair of operating wires having their proximal ends disposed within said body, said two operating wires extending through said insertion portion into said bendable portion and fixedly connected at their distal ends to a distal end of said bendable portion remote from said insertion portion, said fixed distal ends of said two operating wires being spaced from each other generally peripherally of said bendable portion;

(ii) an operating shaft mounted on said body for angular movement about an axis thereof;

(iii) an manipulating member for angularly moving said operating shaft;

(iv) a pair of engaging members provided at said body, said pair of operating wires being extended respectively around said pair of engaging members to be turned back toward said bendable portion;

(v) retainer means retaining the proximal ends of said pair of operating wires; and

(vi) connecting means operatively connecting said operating shaft to said pair of engaging members so that when said operating shaft is angularly moved in one direction, one of said pair of engaging members can be moved away from said bendable portion, with the other engaging member being moved toward said bendable portion, so as to pull said operating wire, associated with said one engaging member, away from said bendable portion, thereby bending said bendable portion in one direction; when said operating shaft is angularly moved in the other direction, said other engaging member being moved away from said bendable portion through said connecting means, with said one engaging member being moved toward said bendable portion, so as to pull said operating wire, associated with said other engaging member, away from said bendable portion, thereby bending said bendable portion in another direction.

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**4,941,456**

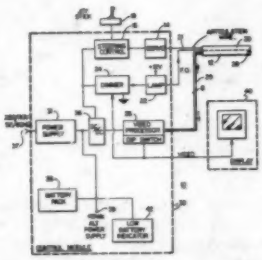
**PORTABLE COLOR IMAGER BORESCOPE**

**Robert J. Wood; Earl H. Slee, both of Syracuse; Gregory E. Pasik, Auburn, and Michael J. Pileski, Warners, all of N.Y., assignors to Welch Allyn, Inc., Skaneateles Falls, N.Y.**

**Filed Oct. 5, 1989, Ser. No. 417,553**

**Int. Cl.[5] A61B *1/06*; G02B *7/00***

**U.S. Cl. 128—6** **16 Claims**



1. A portable steerable borescope or endoscope of the type having, a viewing head, an insertion tube with a cable bendable steering section proximally of the viewing head, at least one pair of steering cables, a fiber optic object illumination channel connected to said viewing head, and an object image channel connected to said viewing head, which comprises;

an image sensor in said viewing head;

servo motor operatively connected to each pair of steering cables in said bendable steering section;

servo control means connected to said servo motor for operating said servo motor,

remote actuator means operatively connected to said servo control means to permit an operator to manipulate said steering section by controlling the rotation of said servo motors;

lamp means positioned to illuminate the object through said fiber optic illumination channel;

video processor means for transforming the object image from said image channel into NTSC format for display;

lamp dimmer means connected to said lamp means and said video processor means for controlling the light output of said lamp means in accordance with the video signal from said image sensor to provide optimum video image brightness;

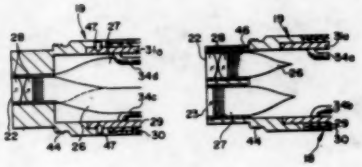
video display means connected to the output of said video processor, via an extended flexible cable for locating said display means remotely from said servo, lamp and video processor means, and

power supply means including a battery pack and means for selectively converting commercial alternating current power to direct current power for charging the battery pack and operating the borescope/endoscope.

## 4,941,457
## ENDOSCOPE USING AN OPTICAL GUIDE TWISTED ON THE TIP SIDE TO HAVE THE VISUAL FIELD DIRECTION AND CURVATURE AXIS COINCIDE WITH EACH OTHER

Hiroshi Hasegawa, Hachioji, Japan, assignor to Olympus Optical Co., Ltd., Tokyo, Japan

Filed Aug. 17, 1989, Ser. No. 394,895
Int. Cl.[5] A61B 1/06; G01N 21/01
U.S. Cl. 128—6 13 Claims



5. An electronic endoscope comprising:

an insetable part consisting of a rigid tip part, a curvable tube part adjacent to said tip part and rotatably connecting a plurality of articulated frames through at least a pair of opposed pivoting parts and a long flexible tube part adjacent to said curvable tube part and consisting of a long flexible tube part;

at least a pair of curving wires secured respectively in one end part near the front end of said curvable tube part, inserted along said respective pivoting parts in the lengthwise direction of said curvable tube part and connected at the respective other ends to a curving mechanism provided in said operating part;

an objective optical system secured within said tip part;

a solid state imaging device arranged in the focal plane of said objective optical system and provided with a photoelectrically converting function;

a flexible signal cable connected in one end part to said solid state imaging device and inserted through said insertable part;

a flexible light guide inserted through said insertable part, transmitting an illuminating light fed to one end surface and emitting the illuminating light from the other end surface fixed to said tip part; and

a fixing means for fixing said objective optical system and light guide to said tip part so that the line connecting the center of said objective optical system and the center of said other end surface of said light guide and the line connecting said pair of pivoting parts may be parallel/vertical to each other,

wherein said signal cable and light guide in the part adjacent to the end part fixed by said fixing means are rotatably displaced around the center axis of said tip part and are inserted through said curvable tube part as displaced from said pivoting parts.

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## 4,941,458
## METHOD FOR AIDING CARDIOCEPITAL VENOUS FLOW FROM THE FOOT AND LEG OF AN AMBULATORY PATIENT

Syde A. Taheri, 268 Dan Troy, Williamsville, N.Y. 14221

Division of Ser. No. 692,579, Jan. 18, 1985, Pat. No. 4,624,244, which is a continuation-in-part of Ser. No. 660,802, Oct. 15, 1984, abandoned. This application Oct. 3, 1986, Ser. No. 914,784
Int. Cl.[5] A61H 9/00
U.S. Cl. 128—64 9 Claims

1. A method for aiding cardiocepital venous flow from the limb of an ambulatory patient comprising the steps of applying pressure successively to only a single group of a plurality of adjacent areas of the soft tissue of said limb of said ambulatory patient in a cardiocepital direction, maintaining the pressure on a preceding less cardiocepital area of said single group of said limb of said ambulatory patient for a portion of the time that the pressure is applied to an adjacent succeeding cardiocepital area, relieving the pressure on each of said preceding areas of said single group after pressure has been applied to each succeeding area of said single group, said plurality of adjacent areas of said single group including a least cardiocepital area and a most cardiocepital area on said limb of said ambulatory patient and at least one area therebetween, maintaining said pressure on said most cardiocepital area of said single group on said limb of said ambulatory patient while applying pressure to

said least cardiocepital area of said single group on said limb of said ambulatory patient, and relieving said pressure from said most cardiocepital area of said single group on said limb of said ambulatory patient only after pressure has been applied to said least cardiocepital area of said single group to thereby prevent reverse venous blood flow in an anti-cardiocepital direction beyond said least cardiocepital area of said single group from said areas of said single group to which said pressure has been applied previously and said relieving of said pressure from said most cardiocepital area of said single group permitting unrestricted blood flow beyond said most cardiocepital area in a cardiocepital direction.

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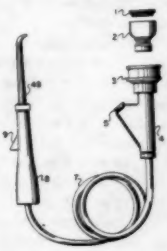
## 4,941,459
## DENTAL HYGIENE DEVICE

Sandip K. Mathur, 13 Sherka Crescent, Kanata, Ontario, Canada K2K 2L4

Filed Jun. 7, 1989, Ser. No. 375,908
Int. Cl.[5] A61G 17/02
U.S. Cl. 128—66 12 Claims



1. A hygiene device comprising:

(a) a handle having a nozzle applicator at one end thereof;

(b) a flexible hose connected at one end thereof to said nozzle applicator and having a faucet nozzle coupling means at the other opposite end thereof;

(c) means for introducing air into a stream of water flowing through said device;

(d) a chamber communicating with said stream of water flowing through said device, said chamber having a removal cap through which a cartridge containing a mouth treatment fluid can be introduced and including cartridge puncturing means in said chamber; and

(e) means for introducing a mouth treatment fluid into said stream of water from said chamber.

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**4,941,460**

**CARPAL BRACE**

**Loren Working, P.O. Box 147, Barberton, Ohio 44203**

**Continuation of Ser. No. 208,773, Jun. 20, 1988, abandoned. This application Nov. 3, 1989, Ser. No. 431,687**

**Int. Cl.[5] A61F *5/00***

**U.S. Cl. 128—77** **8 Claims**

1. A brace for preventing or treating trauma of the carpal tunnel of an arm of a Homo sapiens, said brace comprising:

a rigid spine element, having distal and proximal ends and a middle therebetween, the length of said spine element selected so as to span the distance between the back of the Homo sapiens' hand to the proximal end of the Homo sapiens' forearm, when positioned on the dorsal surface thereof, the width of said spine element being narrow with respect to the width of said Homo sapiens' forearm;

a cross-piece element, having ulnar and radial ends and a middle therebetween, the length of said cross-piece element selected so as to at least span the back of the Homo sapiens' hand from the ulnar to the radial side thereof, said cross-piece element being affixed to or integral with the distal end of the spine element such that the cross-piece element is essentially perpendicular to the spine element and such that the point of connection of the spine element to the cross-piece element is closer to the radial end than the ulnar end thereof; and

at least three cincture means for securing the brace to the arm, the first said cincture means located lengthwise on the cross-piece element so as to pass across the palm and secure the hand contiguously to the brace, the second cincture means near or at the proximal end of the spine element so as to pass around the upper forearm and secure it contiguously to the brace, and the third and any additional cincture means located at least 2½ inches proximal to the proximal end of the carpal bones of the Homo sapiens' hand to secure such additional portion of the forearm contiguously to the brace;

said spine element further being inclined upwardly at its distal end to an angle sufficient to conform to the natural dorsi-lift of the Homo sapiens;

said brace essentially positioned on the dorsal side of the Homo sapiens' arm to prevent ulnar deviation, flexion or hyperextension of the Homo sapiens' wrist while still allowing full mobility of the fingers, thumb and elbow.

**4,941,461**

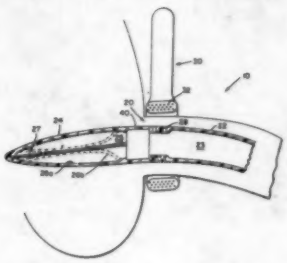
**ELECTRICALLY ACTUATED INFLATABLE PENILE ERECTION DEVICE**

**Robert E. Fischell, 14600 Viburnum Dr., Dayton, Md. 21036**

**Filed Sep. 5, 1989, Ser. No. 403,086**

**Int. Cl.[5] A61F *2/26***

**U.S. Cl. 128—79** **28 Claims**



1. An apparatus for achieving a penile erection in a human male, comprising:

at least one elastomer cylinder having a root chamber and a pendulous chamber, said elastomer cylinder adapted to be placed in the corpus carvenosum of the penis;

an external magnetic field generator which can be placed over some section of the penis which generates an alternating magnetic field;

an induction coil contained within said elastomer cylinder which produces an alternating electric current when in the proximity of said alternating magnetic filed which is produced by said external magnetic field generator; and

a fluid pumping means located within said elastomer cylinder, said pumping means being operated by the electrical power generated in said induction coil to pump fluid from said root chamber to said pendulous chamber in order to stiffen said elastomer cylinder for causing the erect state of the penis.

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**4,941,462**

**ORTHOSIS**

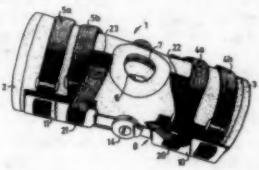
**Ulf Lindberg, Lövhagens Gard, S-170 17 Färentuna, Sweden**

**Filed May 3, 1988, Ser. No. 189,667**

**Claims priority, application Sweden, May 4, 1987, 8701842**

**Int. Cl.[5] A61F *500***

**U.S. Cl. 128—80 C** **6 Claims**



1. An orthosis for stabilizing a joint comprising:

a sleeve of a flexible and stabilizing material having a first portion to be secured on one side of the joint and a second portion to be secured on the other side of the joint;

at least one stabilizer for increasing a lateral bending stability of the sleeve, the stabilizer comprising at least one laterally arranged, two-armed stabilizing splint in which the arms of the splint are connected via a pivot joint, the sleeve being provided in the region where the joint flexes, with a section which is entirely without material;

a patella bracing pad designed to abut the kneecap, the patella bracing pad being adjustably positionable relative to the stabilizer and the patella bracing pad being provided with tapes and the tapes being securable to the stabilizer, the patella pad being adapted to be placed on the inner side of the sleeve to abut the kneecap; and

through-openings in the sleeve, the tapes of the patella bracing pad passing through the through-openings and the free ends thereof being securable to the stabilizer.

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**4,941,463**

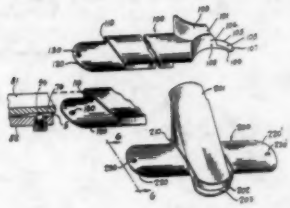
## ORTHOPEDIC CASTING APPARATUS

**Patrick T. Hergenroeder, 48 W. Orange St., Chagrin Falls, Ohio 44022**

**Continuation of Ser. No. 146,969, Jan. 22, 1988, abandoned, which is a division of Ser. No. 54,064, May 19, 1987, Pat. No. 4,726,363, which is a continuation of Ser. No. 791,945, Oct. 28, 1985, abandoned. This application May 5, 1989, Ser. No. 349,893**

**Int. Cl.[5] A61F *5/04***

**U.S. Cl. 128—83** **9 Claims**



1. A limb-positioning attachment for maintaining an extremity in optimal joint alignment during the application of a cast and adapted for use with a casting stand having a plate-like limb-support assembly, said limb-positioning attachment comprising:

structure defining a passage of fixed dimension greater in length and width than height, constructed and arranged to slide lengthwise over, engage, and be supported from within by, a plate-like support and be located in a predetermined orientation with respect thereto by the cross-sectional shape of the passage, which is one of non-revolution;

releasable attachment means engageable with the limb-support assembly to inhibit sliding of the attachment on the support, said means including a tongue extending lengthwise from and beyond one end of the passage and said releasable attachment means being in or on said tongue; and

a limb-engaging surface integral with the structure defining the passage to hold a limb extremity resting on the surface in a desired position.

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**4,941,464**

## SHOULDER ARTHROSCOPY ABDUCTION APPARATUS

**James W. Scott, P.O. Box 7630, Tifton, Ga. 31794**

**Filed Jul. 10, 1989, Ser. No. 377,153**

**Int. Cl.[5] A61G *13/00***

**U.S. Cl. 128—84 R** **15 Claims**

1. A shoulder arthroscopy abduction apparatus for use during a diagnostic and/or surgical procedure comprising:

a generally rectangular, forearm sleeve member having,

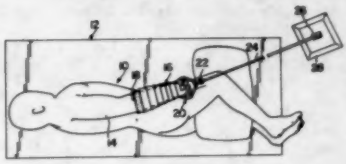
a long axis operable to lie along a patient's arm and flexibly yet securely embrace a patient's forearm, and

at least one releasable retaining means for securing said generally rectangular forearm sleeve member in a generally cylindrical wrap about a patient's forearm;

a generally U-shaped gripping and support member having,

a transverse gripping member operable to receive a patient's hand for grasping support, and

a pair of support arms operable to extend along opposing lateral portions of a patient's forearm; and



means connected between an inside surface of said pair of support arms of said generally U-shaped gripping and support member and an external surface of said generally rectangular forearm sleeve member for releasably attaching said generally U-shaped gripping and support member to said generally rectangular forearm sleeve member.

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**4,941,465**

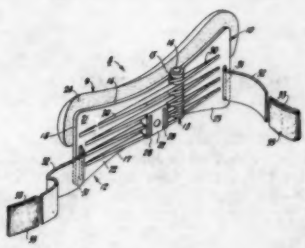
## ISCHIAL PERINEAL CUSHION FOR EMERGENCY TRACTION SPLINT

**Anthony G. Borschneck, 770 Flower Ash La., Redding, Calif. 96003**

**Filed Feb. 21, 1989, Ser. No. 313,214**

**Int. Cl.[5] A61F *5/04, 5/28, 5/02***

**U.S. Cl. 128—87 R** **8 Claims**



1. Ischial perineal cushion for emergency traction splint used to maintain alignment of fractured leg bone comprising:

a. an elongated body extending longitudinally between opposite ends and transversely between opposite sides and between an upper surface and a lower surface, said body being compliant and being laterally bendable to a permanent predetermined non-linear configuration in which said upper surface bears only against the pelvis in countertractive position, said body being a modified hour glass shape in plan with two enlarged end lobe portions and an intermediate constricted portion, and in which said upper surface of said body is saddle-shaped in side elevation;

b. means for connecting said body to the emergency traction splint; and,

c. a bridle closable at opposite ends by an adjustable fastener, said bridle being dimensioned to secure said cushion in fitted position with said cushion in countractive position only against the pelvis.

4,941,466

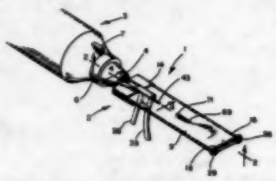
## CURVED BORE DRILLING METHOD AND APPARATUS

Jack W. Romano, 412 NE. 165th, Apt. #13, Seattle, Wash. 98155

Continuation-in-part of Ser. No. 37,697, Apr. 13, 1987, abandoned. This application May 20, 1988, Ser. No. 196,319

Int. Cl.[5] A61B 17/16

U.S. Cl. 606—80 36 Claims



1. An apparatus for drilling a curved bore within a material comprising:

(a) rotary drive means;

(b) drill shaft means having one end adapted for connection to said rotary drive means, said drill shaft means having a distal flexible end section;

(c) cutting means secured to said flexible end section;

(d) mounting means for directing said drill shaft means along a rectilinear path substantially normal to a surface of said material;

(e) guide means carried by said mounting means to guide said flexible end section and said cutting means from said rectilinear path along a curved path to form said curved bore within said material, said rectilinear path having an angle of approach with respect to a surface of said material; and

(f) means for pivotally moving said guide means along said curved path without requiring an alteration of said angle of approach.

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4,941,467

## HUMIDIFICATION FACE MASK

Danzaburo Takata, 21-B803, Kashikiriyama, Suita-shi, Osaka, Japan

Filed Mar. 16, 1989, Ser. No. 324,111

Claims priority, application Japan, Apr. 19, 1988, 63-96343

Int. Cl.[5] A61M 15/00; A62B 7/00, 18/02

U.S. Cl. 128—203.12 7 Claims

1. A humidification face mask comprising: an inner mask member and an outer mask member each shaped into a curved configuration for fitting over the nose and mouth of a wearer, said inner and outer mask members provided respectively with a number of breathing perforations permitting the breathing of the wearer therethrough and being bonded together in a sealed manner along side and lower edges of said inner and outer mask members so as to leave therebetween a top opening;

an air permeable and water absorbent moisturizing pad having a first portion and a second portion inserted through said top opening and held between the inner and outer mask members, said moisturizing pad carrying a volume of water which moisturizes the air inhaled through said breathing perforations by the wearer, said inner and outer mask members forming a shallow concavity and a deep concavity therebetween, said first portion and said second portion of said moisturizing pad being accommodated within said shallow concavity and said deep concavity, respectively, and said second portion supports a large volume of water for supplying water to said first portion by capillary action; and

means for supporting the face mask on the head of the wearer.

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4,941,468

## REGULATOR FOR BREATHING APPARATUS

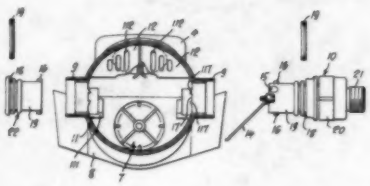
Garofalo Giovanni, Rapallo, Italy, assignor to AMF MARES S.p.A., Italy

Filed May 16, 1989, Ser. No. 352,247

Claims priority, application Italy, Jun. 8, 1988, 12498 A/88

Int. Cl.[5] A61M 16/00

U.S. Cl. 128—204.26 10 Claims



1. In a breathing apparatus for use with a source of compressed air and provided with a first air-pressure reducing stage, the combination of a regulator provided with a second reducing stage and comprising a first chamber having walls communicating with a mouthpiece and a second chamber communicating with the surroundings, said first and second chamber being separated by a membrane which controls the opening and the closure of a dispensing valve within a connector member between said first and said second air-pressure reducing stages, and in which the said first chamber communicating with the said mouthpiece is provided both on the right-hand and left-hand sides with a mating seat for said connector member between the said two air-pressure reducing stages, the said connector member being provided with two symmetrically formed air-dispensing holes, and in which a closing and/or throttling means is provided at each mating seat for cooperation with whichever one of the said two dispensing holes is disposed away from the mouthpiece said connector member being locked in a pre-established position in its seat by means of a bayonet joint, centering and safety means to prevent accidental disconnection of said member.

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4,941,469

## PORTABLE VENTILATOR APPARATUS

Carmeli Adahan, 1316/02 Ramot 03, Jerusalem 97 725, Israel

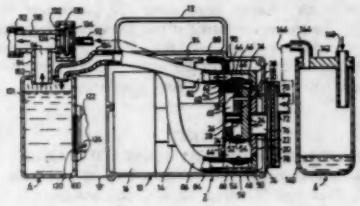
Continuation-in-part of Ser. No. 119,880, Nov. 12, 1987, Pat. No. 4,807,616, which is a continuation-in-part of Ser. No. 71,327, Jul. 9, 1987, Pat. No. 4,823,787. This application May 23, 1988, Ser. No. 197,198

Int. Cl.[5] A61M 16/16, 16/10

U.S. Cl. 128—205.18 20 Claims

11. Ventilator apparatus comprising: a reciprocating pump including a negative-pressure chamber having an inlet for drawing air into the chamber, and a positive-pressure chamber having an outlet for outletting pressurized air; delivery means for delivering pressurized air to a patient; an exhalation valve assembly producing breathing cycles in which the delivery

means is first connected to the patient to effect inhalation, and then is vented to the atmosphere to permit exhalation; control means for operating said pump at a speed to effect at least two cycles of operation for each breathing cycle of the exhalation



valve; and a control valve operated by said pump for controlling the breathing cycles of the exhalation valve; said pump including an expansible bellows in the flow path of the air from the positive-pressure chamber to the delivery means to damp oscillations in pressure produced by the reciprocating pump.

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**4,941,470**

**FACE MASK WITH EAR LOOPS AND METHOD FOR FORMING**

**Vance M. Hubbard, and Welton K. Brunson, both of Bedford, Tex., assignors to Tecnol, Inc., Fort Worth, Tex.**

**Continuation-in-part of Ser. No. 815,753, Dec. 31, 1985, Pat. No. 4,802,473, which is a continuation of Ser. No. 549,392, Nov. 7, 1983, abandoned. This application Jan. 11, 1988, Ser. No. 142,743**

**Int. Cl.[5] A62B 7/10**

**U.S. Cl. 128—206.13** **1 Claim**

1. A method for fabricating a sanitary face mask, comprising:

fabricating a layer of meltblown polypropylene fabric having a horizontal and vertical axis;

forming at least one pleat in the meltblown layer along the horizontal axis thereof such that the pleated meltblown layer is dimensioned to fit over the mouth and nostrils of a wearer;

heat sealing the sides of the pleated meltblown layer along the vertical axis thereof to allow the pleats to expand in the center portion only;

disposing a semi-rigid member along one edge of the pleated meltblown layer parallel to the horizontal axis thereof and folding a portion of the edge over the semi-rigid member, the folded-over portion being heat sealed about the perimeter of the semi-rigid member to completely enclose the semi-rigid member;

forming first and second ear loops from narrow strips of a combination of textured polyester and lycra spandex, said combination comprising 90.33 percent textured polyester and 9.67 percent lycra spandex so that the edges of each of said ear loops curl over to form a rounded cross section therefor; and

attaching the free ends of each of the ear loops on opposite ends of one of the lateral sides of the pleated beltblown material on a vertical edge thereof by heat bonding.

**4,941,471**

**RATE STABILIZATION PACEMAKER**

**Rahul Mehra, Stillwater, Minn., assignor to Medtronic, Inc., Minn.**

**Filed Sep. 7, 1988, Ser. No. 241,285**

**Int. Cl.[5] A61N 1/36**

**U.S. Cl. 128—419 PG** **7 Claims**

1. An improved cardiac pacemaker of the type comprising:

sensing means for sensing contractions of a chamber of the heart, including premature contractions of said chamber of the heart;

pulse generating means for delivering stimulation pulses to said chamber of said heart; and

timing means responsive to said sensing means and coupled to said pulse generating means, said timing means defining escape intervals following sensed contractions of said chamber, including premature contractions or following stimulation pulses applied to said chamber, and triggering said pulse generating means after the expiration of said escape intervals;

wherein the improvement comprises:

control means responsive to said pulse generating means and responsive to said sensing means for adjusting the escape interval determined by said timing means after either each sensed natural contraction of said chamber, including premature contractions or in response to the triggering of each stimulation pulse, said control means adjusting the escape interval defined by said timing means to be equal to the length of the cardiac cycle immediately preceding said sensed natural contraction or said stimulation pulse, plus a predetermined increment of time determined by said control means.

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**4,941,472**

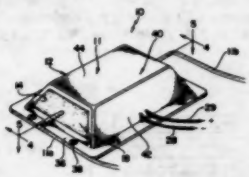
**ELECTRICAL ACCESS PORT ASSEMBLY**

**James R. Moden, Bristol; Michael D. Caldwell, East Greenwich, and Robert D. Moden, Warren, all of R.I., assignors to Surgical Engineering Associates, Inc., Bristol, R.I.**

**Filed Apr. 13, 1989, Ser. No. 338,232**

**Int. Cl.[5] A61N 1/00**

**U.S. Cl. 128—419 PS** **6 Claims**



1. An electrical access port assembly for supplying electrical energy to a predetermined location in the body of a patient comprising a surgically implantable body portion having first and second enclosed, electrically insulated interior cavities therein, said body portion including first and second penetrable septa which are self-sealingly penetrable to gain access to said first and second cavities, respectively, first and second electrical contact means in said first and second cavities, respectively, first and second insulated electrical conductor means electrically communicating with said first and second electrical contact means, respectively, said conductor means being surgically implantable in the body of said patient so that they extend to said predetermined location therein, and first and second

electrically conductive needle means, each including an elongated electrically insulated shank portion and an electrically exposed tip portion, said first and second septa being self-sealingly penetrable by said first and second needle means, respectively, for electrically connecting the tip portions of said first and second needle means to said first and second contact means, respectively, without otherwise electrically connecting said first and second needle means to the body of said patient when said access port is surgically implanted in said patient.

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**4,941,473**

**GUIDE FOR MECHANICAL GUIDING OF A CATHETER IN CONNECTION WITH CARDIO AND VASCULAR EXAMINATION**

**Lars Tenerz, Upsala; Bertil Hök, Västerås, and Thomas Engström, Upsala, all of Sweden, assignors to Radisensor AB, Upsala, Sweden**

**PCT No. PCT/SE87/00347, § 371 Date Jan. 11, 1989, § 102(e) Date Jan. 11, 1989, PCT Pub. No. WO88/00810, PCT Pub. Date Feb. 11, 1988**

**PCT Filed Jul. 31, 1987, Ser. No. 297,256**

**Claims priority, application Sweden, Aug. 4, 1986, 8603304**

**Int. Cl.[5] A61B *5/00***

**U.S. Cl. 128—637** **26 Claims**

1. A guide wire having a distal end and proximal end for mechanically guiding a medical probe, comprising:

(a) a miniaturized pressure sensor disposed at the distal end of the guide wire;

(b) an air ventilation passage connecting the pressure sensor to a source of reference pressure;

(c) a sheath formed of at least a first part adjacent the proximal end and a second part adjacent the pressure sensor, the sheath determining the torsional stiffness of the guide wire;

(d) the first part being substantially inflexible and the second part being more flexible.

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**4,941,474**

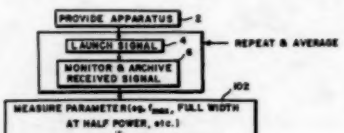
**MULTIVARIABLE ANALYSIS OF BONE CONDITION**

**George W. Pratt, Jr., Wayland, Mass., assignor to Massachusetts Institute of Technology, Cambridge, Mass.**

**Filed Jul. 1, 1988, Ser. No. 214,184**

**Int. Cl.[5] A61B *8/00***

**U.S. Cl. 128—660.01** **21 Claims**




1. A method of assessing the condition, in a subject patient, of a bony member which may be surrounded by soft tissue, such method comprising the steps of:

a. launching into the patient proximate the surface of the bony member an ultrasound pulse signal having components in a range from at least about 100 kHz to about 600 kHz;

b. receiving from the bony member ultrasound energy in said range and generating electrical signal (termed "received signals") corresponding to said received ultrasound energy;

c. extracting from the received signals a plurality of parameter values characterizing the received signals; and

d. performing a multivariable analysis on said parameter values, such analysis comparing the parameter values against the statistical distributions for such parameters in patients of known bone condition, and providing a probability that the condition of the bony member of the subject patient matches the known bone condition.

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**4,941,475**

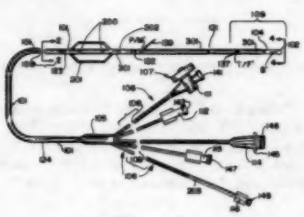
**THERMODILUTION BY HEAT EXCHANGE**

**Wilbur R. Williams; Gene A. Bornzin, both of Camarillo, and John S. Thompson, Oxnard, all of Calif., assignors to Spectramed, Inc., Oxnard, Calif.**

**Continuation of Ser. No. 239,128, Aug. 30, 1988, abandoned. This application Aug. 7, 1989, Ser. No. 394,252**

**Int. Cl.[5] A61B *5/028***

**U.S. Cl. 128—692** **13 Claims**



1. A process for determining flow rate of blood along a flow path in a living body, comprising the steps of:

a. removing heat from such blood flowing through such body, by heat exchange at a position along such flow path, without liquid injection into such blood;

b. monitoring temperature;

c. determining flow rate from the monitored temperature and known parameters related to the amount of heat removed;

d. periodic repetition of steps a–c;

e. between each pair of successive periodic repetitions, adding heat to such flow of blood; whereby a balance of heat flow to and from such body is at least roughly preserved and temperature modulation of such blood flow is increased.

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**4,941,476**

**NON-INVASIVE METHOD AND APPARATUS FOR MEASURING MIXED VENOUS BLOOD CARBON DIOXIDE PRESSURE (PVC02) AND OTHER PHYSIOLOGICAL VARIABLES**

**Joseph Fisher, 113 Franhore Cir. Thornhill, Canada L4J3B9, assignor to Joseph Fisher, Thornhill, Canada**

**Division of Ser. No. 912,969, Sep. 29, 1986. This application Aug. 27, 1987, Ser. No. 89,877**

**Int. Cl.[5] A61B *5/08***

**U.S. Cl. 128—719** **9 Claims**

1. A method of determining the functional residual capacity of a patient, the method comprising the steps of:

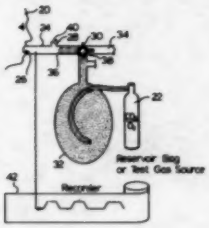
(a) measuring the Partial Pressure of an inert insoluble gas (hereinafter referred to as $P_{IG}$) of the gases inhaled and exhaled by the patient under controlled conditions without rebreathing

(b) causing the patient to inhale a test gas containing an inert gas of a partial pressure $P_{IIG}$ where $P_{IIG}$ is a partial pressure other than the control partial pressure of sub para-

graph (a) and continuing to measure the $P_{IG}$ of the inhaled and exhaled gases, the patient taking at least one breath without rebreathing

(c) causing the patient to return to breathing under control conditions

(d) determining the partial pressure of the inhaled inert gas $P_{IIG}$ and the end tidal partial pressure of the same inert gas $P_{EIG}$




(e) determining the difference between the $P_{EIG}$ and $P_{IIG}$ under control and test conditions and relating it to the $P_{IIG}$ of the control and test conditions

(f) determining the tidal volume

(g) determining mathematically the slope S of the relation $P_{EIG}$ minus $P_{IIG}$ Versus $P_{IIG}$

(h) determining FRC (Functional Residual Capacity) in accordance with the formula $FRC=1+S/VT-VT$ where S is the slope and VT is the tidal volume.

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**4,941,477**

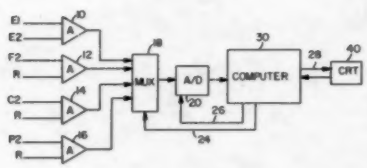
## METHOD AND APPARATUS FOR DETECTION OF DECEPTION

**Lawrence A. Farwell, Urbana, Ill., assignor to University Patents, Inc., Westport, Conn.**

**Continuation of Ser. No. 94,956, Sep. 9, 1987, abandoned. This application Dec. 2, 1988, Ser. No. 279,585**

**Int. Cl.[5] A61B 5/04**

**U.S. Cl. 128—731** **16 Claims**




1. A method for determining if a subject is concealing information concerning an event which comprises:

exposing the subject to both relevant and irrelevant multiple information stimuli concerning an event;

monitoring the subject's EEF outputs in response to said stimuli;

segregating the subject's EEF outputs generated in response to said relevant and irrelevant stimuli; and

determining any difference between the segregated EEF outputs.

**4,941,478**

## PILLOW FOR CONTROLLING SNORING

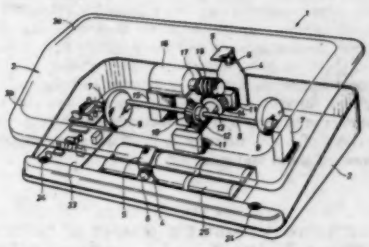
**Shohei Takeuchi; Kuniaki Miyazawa, both of Tokyo, and Takenosuke Ikematsu, Noda, all of Japan, assignors to Shohei Takeuchi, Tokyo, Japan**

**Filed Jun. 24, 1988, Ser. No. 211,303**

**Claims priority, application Japan, Feb. 19, 1986, 61-34827**

**Int. Cl.[5] A61F 5/56**

**U.S. Cl. 128—848** **15 Claims**



1. A pillow for controlling snoring of a sleeping person, comprising:

a stationary base;

a cover placed above the stationary base for placing a head of a person thereon, the cover being disposed in a freely rotatable manner relative to the base about a substantially horizontal central line of rotation;

power drive means mounted on said stationary base for causing a reciprocating rotational motion of the cover about the central line of rotation;

snoring noise detecting means for detecting an occurrence of snoring noise; and

control means operatively connected to both the power drive means and the snoring noise detecting means for activating the power drive means for a predetermined time interval upon detection of snoring by said snoring noise detecting means whereby said cover is rotated into a different angular position.

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**4,941,479**

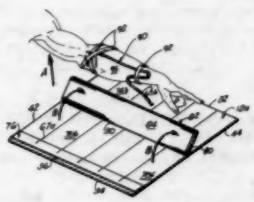
## SURGICAL WRAP WITH ARM SPLINT

**John P. Russell, Centerpoint; Sam Miller, Birmingham, and Terry Carroll, Dora, all of Ala., assignors to Infection Control Products, Inc., Gardendale, Ala.**

**Filed Sep. 5, 1989, Ser. No. 402,914**

**Int. Cl.[5] A61N 1/00**

**U.S. Cl. 128—877** **21 Claims**



1. A protecting and restraining apparatus for use in applying an intravenous or catheter system to an extremity of the body for substantially immobilizing the extremity while permitting continuous intravenous catheter system operation comprising:

(a) an elongated flexible sheet member being adapted to be

wrapped about and encompass an extremity of the body, said sheet member further comprising:

i. a main base portion; and,

ii. a plurality of strap members integrally formed with and transversely depending from said main base portion at a marginal longitudinal edge of said main base portion, each of said strap members being severably connected to its adjacent strap members at selected points along confronting marginal transverse edges of said adjacent strap members;

(b) an elongated flexible sleeve member pivotally attached to said sheet member along one marginal longitudinal edge of said sleeve member so as to allow pivoting of said sleeve member toward and away from a first surface of said sheet member, said sheet member being adapted to accept and retain a stiffening member therein; and,

(c) means for securing said sheet member and said sleeve member in engagement with a corresponding confronting portion of said extremity when said sheet member is wrapped about said extremity.

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**4,941,480**

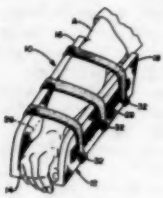
## DEVICE FOR IMMOBILIZING LIMB OF PATIENT

**Philip W. McLean, 3356 Revere Rd., and Russell R. English, 3834 Broadview Rd., both of Richfield, Ohio 44286**

**Filed Jun. 7, 1989, Ser. No. 362,481**

**Int. Cl.[5] A61F *13/00***

**U.S. Cl. 128—878** **6 Claims**



1. A device for immobilizing a limb of a patient, said device being resilient and comprising:

(a) a longitudinally extending resilient elongated three-sided support member comprising a resilient core and a thin adherent waterproof, washable coating thereon, said support member being of generally U-shaped cross section, and straight in the longitudinal direction, said support member comprising a bottom wall and a pair of side walls extending upwardly from opposite side edges of said bottom wall, said bottom wall and said side walls each being essentially rectangular in shape and of substantially uniform thickness and having planar outside surfaces and planar inside surfaces, said support member being open at the top; and

(b) fastener means including a member adapted to be removably attached to said upwardly extending sides and to extend across the open top of said support member.

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**4,941,481**

## DEVICE FOR POSITIONING AND SECURING A PART HAVING CIRCULAR REGIONS

**Marcel Wagenknecht, Le Ligon, Switzerland, assignor to Jaquet Orthopedie, S.A., Geneva, Switzerland**

**Filed Nov. 26, 1986, Ser. No. 935,416**

**Claims priority, application Switzerland, Nov. 29, 1985, 5119/85; Sep. 29, 1986, 3894/86**

**Int. Cl.[5] A61F *5/04***

**U.S. Cl. 606—59** **20 Claims**

1. A system comprising a part to be positioned and secured and a device for positioning and securing said part, said device comprising two jaws arranged to be pressed against each other to clamp said part, wherein at least one element selected from the group consisting of said part and said jaws comprises at least one region, the cross-section of which is circular, wherein said at least one region has a succession of facets regularly arrayed over at least a portion of said at least one region, wherein adjacent facets meet at obtuse angles and wherein the

boundaries between adjacent facets are sharp edges or sharp points, wherein said at least one region is located on said part to be positioned and secured, wherein the surfaces of the jaws in contact with said part are smooth, and wherein said part to be positioned and secured comprises a sphere having at least one faceted segment, and wherein said sphere includes a central bore intended to receive a rod.

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**4,941,482**

## APPARATUS FOR MEASURING THE DENSITY OF A TOBACCO STREAM

**Uwe Heitmann, Hamburg; Heinz-Christen Lorenzen, Wentorf; Wolfgang Siems, Hamburg, and Peter Pinck, Gross-Hansdorf, all of Fed. Rep. of Germany, assignors to Körber AG, Hamburg, Fed. Rep. of Germany**

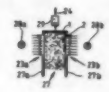
**Filed Jul. 28, 1988, Ser. No. 225,693**

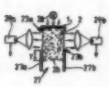
**Claims priority, application Fed. Rep. of Germany, Jul. 31, 1987, 3725366**

**The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.**

**Int. Cl.[5] A24C *5/14***

**U.S. Cl. 131—84.4** **4 Claims**



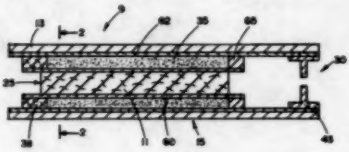


1. A method of measuring the density of an unwrapped tobacco stream in a rod making machine, comprising the steps of advancing the stream by a radiation-permeable conveyor along a first path; directing against the stream at least one beam of radiation along a second path adjacent a predetermined portion of said first path so that radiation which propagates itself along the second path penetrates into and through the stream and through the conveyor and that radiation which penetrates through successive increments of the stream is indicative of the density of the respective increments; and measuring the intensity of radiation which penetrates through and issues from the conveyor.

## 4,941,483
## AEROSOL DELIVERY ARTICLE

Henry T. Ridings, Lewisville, and Chandra K. Banerjee, Pfafftown, both of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Sep. 18, 1989, Ser. No. 410,191
Int. Cl.[5] A24D *1/00, 1/18*
U.S. Cl. 131—194 23 Claims



1. An aerosol delivery article comprising:
(a) a volatile component including a flavor and/or a drug; and
(b) a non-combustion heat source for heating the volatile component, and including
(i) at least two metallic agents capable of interacting electrochemically with one another, and
(ii) a normally solid dispersing agent.

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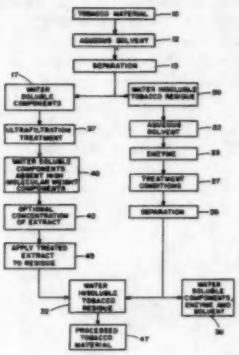
## 4,941,484
## TOBACCO PROCESSING

William L. Clapp, and Barry S. Fagg, both of Winston-Salem, N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed May 30, 1989, Ser. No. 358,725
Int. Cl.[5] A24B *15/20, 15/24*
U.S. Cl. 131—297 15 Claims



1. A process for reducing the protein content of tobacco material, the process comprising:
(i) extracting components from tobacco material with a solvent having an aqueous character;
(ii) separating extracted tobacco components from extracted tobacco material;
(iii) subjecting the extracted tobacco material to aqueous enzyme treatment to decompose essentially water insoluble protein components of the tobacco material to water soluble and/or water dispersible fragments; and separating tobacco material subjected to such treatment from decomposed protein fragments resulting from such treatment;
(iv) subjecting the extracted tobacco components to membrane treatment and collecting permeate resulting from such treatment; and
(v) contacting the extracted tobacco material resulting from step (iii) with the permeate collected in step (iv).

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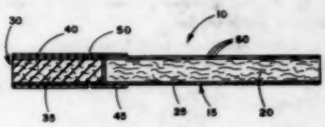
## 4,941,485
## CIGARETTE

Patricia F. Perfetti, Winston-Salem, and Gary R. Andersen, Clemmons, both of N.C., assignors to R. J. Reynolds Tobacco Company, Winston-Salem, N.C.

Filed Apr. 18, 1989, Ser. No. 339,933
Int. Cl.[5] A24D *4/02*
U.S. Cl. 131—365 30 Claims



1. A cigarette comprising a rod of smokable material contained in a circumscribing paper wrapping material, the wrapping material having (i) a cellulosic base web containing a water insoluble inorganic filler, (ii) an amount of water soluble alkali metal salt to provide at least about 5 mg water soluble alkali metal cation per gram of dry base web, (iii) an amount of water soluble alkali earth metal salt to provide at least about 5 mg water soluble alkali earth metal cation per gram of dry base web, and (iv) an amount of said water soluble alkali metal salt and said water soluble alkali earth metal salt to provide at least about 20 mg water soluble alkali metal and alkali earth metal ions per gram of dry base web.

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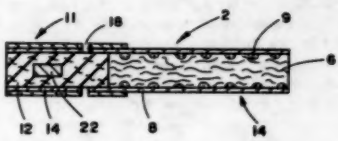
## 4,941,486
## CIGARETTE HAVING SIDESTREAM AROMA

Michael F. Dube, 1641 Eaglecrest Dr., Pfafftown, N.C. 27040, and Barry L. Saintsing, Rte. 8, Lexington, N.C. 27292

Continuation-in-part of Ser. No. 827,568, Feb. 10, 1986. This application Jan. 15, 1988, Ser. No. 145,724
Int. Cl.[5] A24B *3/12;* A24D *1/02*
U.S. Cl. 131—365 28 Claims

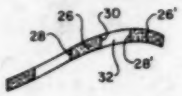


1. A cigarette comprising smokable material contained in circumscribing wrapping material, the wrapping material having in intimate contact therewith a flavor precursor in an amount sufficient to provide alteration to the aroma of the sidestream smoke of the cigarette upon burning during use thereof; wherein the flavor precursor provides substantially less perceivable aroma characteristics to the mainstream smoke of the cigarette than to the sidestream smoke during use thereof, and wherein the flavor precursor provides essentially no perceivable aroma characteristics to the cigarette prior to use thereof.

## 4,941,487
## FLUORIDATED DENTAL FLOSS

Floyd V. VanBeneden, 26330 Shirley Ave., Euclid, Ohio 44132

Filed Jul. 11, 1989, Ser. No. 377,958
Int. Cl.[5] A61C *15/00*
U.S. Cl. 132—323 1 Claim




1. Dental floss consisting entirely of:
an elongated base of dental-floss material having an undefined length, said base being ribbon-like in form to have a rectangular cross-section;
patches of fluoride on said base, said patches each being approximately one-half inch in length and being spaced apart about one-half inch, and being less than about one mm in thickness.

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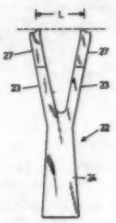
## 4,941,488
## TENSILE THREAD HOLDER FOR TOOTH CARE

Rochus Marxer, Römerstrasse 217, FL-9485 Nendeln, and Reinhard Franck, Heiligkreuz 51, FL-9490 Vaduz, both of Liechtenstein

Filed Apr. 7, 1988, Ser. No. 178,496
Claims priority, application Austria, Apr. 17, 1987, 982/87
Int. Cl.[5] A61C *15/00*
U.S. Cl. 132—323 1 Claim

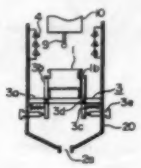



1. A holder for receiving a tensile thread for tooth care, particularly for cleaning the spaces between teeth, the ends of the thread having thickened portions in the form of spherical knots, a plurality of tensile threads arranged in a row spaced apart from each other and parallel relative to each other, the threads having a length which corresponds approximately to the mounting length in the holder, the knots located immediately adjacent to each other on each side of the row of threads being connected to each other in reduced-diameter intended breaking points, the holder comprising two fork-like arms with free ends, the free ends defining slots for receiving the thread, wherein the slots are provided in spherically-shaped outwardly facing indentations for receiving the spherical knots of the threads, the arms defining outer edges, the indentations being offset toward the middle of the fork-type arms relative to the outer edges of the arms, the arms having shoulder surfaces adjacent the spherical indentations, the shoulder surfaces being offset relative to the outer ends of the arms and being concavely arched, and parallel edges formed between the shoulder surfaces defining sharp cutting edges for cutting the intended breaking points.

## 4,941,489
## CARRIER CLEANING AND DRYING APPARATUS

Yasuo Kamimura, Hachioji; Toshiaki Ohmori, Itami; Motonori Yanagi, Itami; Takaaki Fukumoto, Itami, and Masaharu Hama, Itami, all of Japan, assignors to Dan Science Co., Ltd. and Mitsubishi Denki Kabushiki Kaisha, both of, Japan

Continuation of Ser. No. 190,336, May 5, 1988, abandoned. This application Sep. 5, 1989, Ser. No. 402,988
Claims priority, application Japan, May 6, 1987, 62-67625[U]; May 6, 1987, 62-67626[U]
Int. Cl.[5] B08B *3/02*
U.S. Cl. 134—95 9 Claims




1. An apparatus for cleaning and drying a wafer processing carrier comprising:
a cleaning tank having at least one side wall and upper and lower portions for accommodating a wafer processing carrier;
a high-pressure injection nozzle disposed in the upper portion of said cleaning tank for injecting a cleaning solution toward the wafer processing carrier in said cleaning tank at high pressure;
means for supporting the wafer processing carrier in said cleaning tank and for swinging the wafer processing carrier through an arc while the cleaning solution is being injected toward the wafer processing carrier;
means for moving said high-pressure injection nozzle within said cleaning tank while the cleaning solution is being injected toward the wafer processing carrier; and
a shower nozzle disposed on said side wall of said cleaning tank for spraying the cleaning solution on said carrier.

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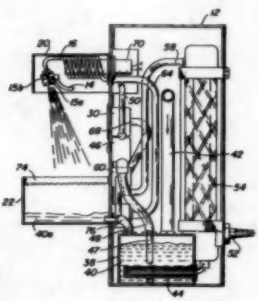
## 4,941,490
## LOW TEMPERATURE APPARATUS FOR CLEANING JEWELRY AND GEMS

Stanley Gross, 1311 Green Rd., Roslyn, Pa. 19001

Filed Mar. 10, 1989, Ser. No. 321,677
Int. Cl.[5] B08B *3/02*
U.S. Cl. 134—98 18 Claims




1. An apparatus for low temperature cleaning of jewelry or sensitive gems which comprises:
a liquid system containing a cleaning liquid of water;
means for delivery of said liquid as a mist into a cleaning

zone, and including means to maintain the temperature of the mist delivered into the cleaning zone substantially between 84° and 104° F.;

a compressed gas system;

means for delivery of compressed gas from said gas system into said cleaning zone;

means to control the delivery of said compressed gas; and

means to control the delivery of said liquid.

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**4,941,491**

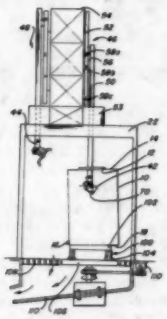
**METHOD AND APPARATUS FOR CLEANING CONTAINERS**

**William G. Goerss, Fenton, and William J. Farrah, Grosse Pointe Farms, both of Mich., assignors to Automated Cleaning Systems, Inc., Westland, Mich.**

**Filed Apr. 7, 1989, Ser. No. 335,095**

**Int. Cl.[5] B08B** *3/02, 9/18*

**U.S. Cl. 134—111** **18 Claims**



1. In an apparatus for cleaning containers having an opening in a top thereof, said apparatus having a spray head for spraying cleaning fluid onto the interior of the container, wherein the improvement comprises:

vertical positioning means for vertically moving the spray head along a vertical axis to a plurality of preselected positions within the container;

tilting means for tilting the spray head about a horizontal axis so that solvent is sprayed onto the interior walls of the container at a plurality of preselected angles;

means for rotating the container about a vertical axis relative to the spray head; and

an external spray head for cleaning exterior portions of the container.

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**4,941,492**

**RAZOR BLADE RINSING DEVICE**

**Dale D. Morgan, 28168 Lorraine, Warren, Mich. 48093**

**Filed May 18, 1989, Ser. No. 353,544**

**Int. Cl.[5] B08B** *3/02*

**U.S. Cl. 134—182** **6 Claims**

1. A body with a cavity formed therein for removably receiving a razor head, comprising:

a) at least two side walls;

b) means for sealing attachment of the body to a directed fluid source;

1) the means for attachment being formed within the body,

2) the means for attachment having:

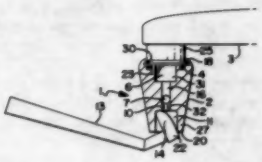
i) a semi-circular side surface open to at least one body side wall;

ii) a bottom surface;

iii) the semicircular surface and the bottom surface forming a receiving aperture for receiving the fluid source;

iv) the means for attachment having an annular gasket on the bottom surface to opposingly mate with and seal a terminus of the fluid source;

c) a first conduit formed within the body in fluid communication with the receiving aperture the first conduit having a receiving end and a discharge end, the receiving end having a diameter larger than that of the discharge end;



d) a second conduit formed within the body in fluid communication with the discharge end of the first conduit, the second conduit having at least one fluid outlet;

e) the cavity formed within the body being sized for receiving a razor blade, the cavity being in fluid communication with the outlet of the second conduit and an exterior surface of the body.

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**4,941,493**

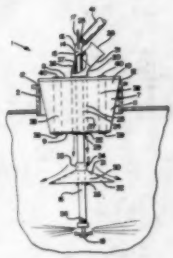
**DEVICE FOR WASHING AND DRYING THE INSIDE TANK OF A TANKER TRUCK**

**Tom Wieringa, Oakbrook, Ill., assignor to Carry Companies of Illinois, Bridgeview, Ill.**

**Filed Aug. 15, 1988, Ser. No. 232,661**

**Int. Cl.[5] B08B** *3/02*

**U.S. Cl. 134—166 R** **6 Claims**



6. A device for washing and drying the inside tank of a tanker truck, said device being adaptable for fitting into a manway located in the tank, said device comprising:

a cone-shaped base comprising an upper portion having a top and a lower portion having a bottom, the diameter of the lower portion being sufficiently small to allow said lower portion to pass through the manway and the diameter of the upper portion being sufficiently large to prevent said upper portion from passing through said manway;

a washing medium tube having an inlet and an outlet, said washing medium tube passing through said base in an axial direction, said inlet extending above the top of said base and said outlet extending below the bottom of said base;

a drying medium tube having an inlet and an outlet, said drying medium tube passing through said base in an axial direction, said inlet extending above the top of said base and said outlet terminating near the bottom of said base;

the longitudinal axis of a portion of the washing medium

tube and the longitudinal axis of a portion of the drying medium tube being on the same line, the diameter of said drying medium tube portion being larger than the diameter of said washing medium tube portion thereby forming an annulus about said washing medium tube portion to provide a drying medium passageway;

a cone-shaped deflector located below the bottom of said base and having its center on the axis line of said drying medium tube portion and said washing medium tube portion, said deflector having an upper portion and a lower portion said upper portion being slidably affixed to said washing medium tube below the bottom of said base, the diameter of the upper portion being less than the diameter of the lower portion; and

a plurality of vent tubes each having an inlet and an outlet, said vent tubes passing through said base in an axial direction, said inlets terminating near the bottom of said base and said outlets terminating near the top of said base, the diameter of said vent tubes being sufficiently large to allow ventilation from the tank but sufficiently small to maintain a pressure greater than atmospheric in the tank.

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**4,941,494**

## LIGHTLY-OPERATING AUTOMATIC UMBRELLA FOR PREVENTING FALSE OPERATION

**Tsun-Zong Wu, No. 16, Chen Tai Rd., Sec. 3, Wu-Ku Hsiang, Taipei Hsien, Taiwan (24801)**

**Filed Oct. 23, 1989, Ser. No. 425,463**
**Int. Cl.[5] A45B *25/16***
**U.S. Cl. 135—20 M** **9 Claims**

1. An automatic umbrella comprising:

a central shaft means including a lower tubular shaft, a grip fixed on a lower portion of said lower tubular shaft, a sleeve inserted in said lower shaft, an upper tubular shaft telescopically mounted on said lower tubular shaft, and an upper notch formed on an upper portion of said upper shaft;

a rib assembly for securing an umbrella cloth thereon including at least a top rib having an inner end portion of said top rib pivotally secured to said upper notch and a stretcher rib pivotally secured to at least one said top rib having an inner end portion of said stretcher rib pivotally secured to a runner slidably encompassed on said upper shaft;

an extending spring formed as an elongate coil spring retained in said central shaft means having a lower end of said extending spring retained on an upper end of said sleeve and having an upper end of said extending spring retained on an inner block secured to said upper notch inside said upper shaft, said extending spring having a length when releasing its elastic force upon an extension of said central shaft means generally equal to a length of an extended central shaft means;

at least a retraction restoring means secured in said rib assembly normally urging said rib assembly downwardly inwardly towards said central shaft means for closing the umbrella; and a control means formed in said grip selectively actuating an extension controller formed in an upper portion of said grip for extending said shaft means and said rib assembly for opening the umbrella, or actuating a retraction controller generally formed in a lower portion of said grip and inside said shaft means for closing the umbrella;

the improvement which comprises:

said extension controller generally formed as a biasing lever pivotally secured in a socket formed in an upper side portion of said grip, having a hook portion formed on an upper portion of said extension controller engageable with a hook hole formed in a lower portion of said upper shaft, and a depression block formed on a lower portion of said extension controller resiliently protruding outwardly by a tensioning spring in said grip to be depressible by said control means for biasing said hook portion inwardly to engage said hook hole in said upper shaft for locking said upper shaft for folding the shaft means and the umbrella; and

said retraction controller including a sliding latch resiliently formed in a lower portion of said grip to be operatively depressed by said control means, a drag rod slidably held inside said shaft means having a locking head formed on a lower end portion of said drag rod normally locked by said sliding latch, and a flexible rope having an inner end portion of said rope connected to said drag rod and operatively trailed inside said shaft means or outside a tubular wall of said upper shaft as guided by at least a roller pivotally secured in said inner block of said upper notch, and having an outer end portion of said rope secured to said runner, said rod and said rope linearly linked with the locking head locked by said sliding latch to counteract a retraction force urged by said retraction restoring means for preventing a false closing operation of the umbrella when the rib assembly and shaft means are extended to open the umbrella.

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**4,941,495**

## CONVALESCENT AID

**Marion E. Boyce, and Henrietta E. Boyce, both of Timbercreek Apt. 310, 415 Augusta Blvd., Naples, Fla. 33962**

**Continuation of Ser. No. 241,088, Sep. 6, 1988, abandoned. This application Oct. 26, 1989, Ser. No. 427,973**
**Int. Cl.[5] A61H *3/00***
**U.S. Cl. 135—65** **24 Claims**

1. A portable convalescent aid for aiding a partially incapacitated or convalescing individual in moving between a standing position and a sitting position from an elevated flat surface, comprising:

a pair of spaced-apart handle portions, each said handle portion having two ends thereon;

a pair of front leg portions, each said front leg portion extending down from adjacent one end of one of said handle portions, the lower ends of said front leg portions being constructed and arranged to rest upon a surface;

a pair of rear leg portions, each said rear leg portion extending down from adjacent the other end of one of said handle portions said rear leg portions being longer than said front leg portions; and

a connecting portion disposed between and connecting said rear leg portions to each other at the lower most ends thereof, said rear leg portions and said front leg portions being dimensioned to rest on said elevated surface to provide said handle portions substantially at the waist level of an individual when seated on said elevated surface so that the individual may readily grasp said handle portions to support the individual's weight thereon and on said connecting portion to assist the individual in moving between the sitting and standing positions.

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**4,941,496**

**WALKER WITH PIVOTING WHEEL**

**Louis G. Berning, 285 Canyon Mesa Dr., Sedona, Ariz. 86336**

**Filed Mar. 23, 1989, Ser. No. 327,694**

**Int. Cl.[5] A61H *3/00***

**U.S. Cl. 135—67** **13 Claims**

1. A walker comprising:

a frame having a pair of spaced apart upright members, and a crosspiece extending between the upright members adjacent the lower end thereof;

a handle portion attached to the upright members adjacent the upper end thereof, said handle portion including a grip pair located above each upright member, each of said pairs including two grips located one above the other, and a transverse element extending between said grip pairs; and

a foot located on the lower end of each upright member and arranged to be perpendicular to the upright member, each foot including a surface-contacting pad which is fixed to said upright member and is constructed and arranged to support the walker on a surface, said pad having a first hinge portion integrally formed therewith and extending forward thereof, said foot further including a second hinge portion flexibly secured to said first hinge portion by a horizontally extending hinge pin and a wheel carried in a wheel mount fixed to said second hinge portion wherein said wheel is hinged to said pad and is flexibly biased to extend linearly from an end of said pad to pivot in a vertical plane about said hinge pin.

**4,941,497**

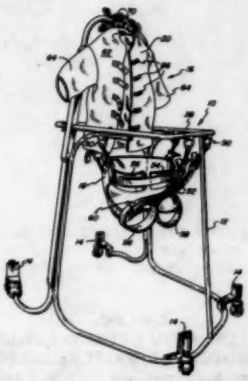
**WALKER**

**William R. Prather, 1433 Beacon St., #709, Brookline, Mass. 02146; Warren Wong, 3231 Allan Pl., and Palmer Hafdahl, 21 Craigside Pl. #8D, both of Honolulu, Hi. 96817**

**Filed Mar. 8, 1989, Ser. No. 320,661**

**Int. Cl.[5] A61H *3/00***

**U.S. Cl. 135—67** **16 Claims**



1. A walker, comprising:

an adjustable frame;

a stability bar affixed to and projecting outwardly from said frame for a person to hold while walking, wherein said stability bar is adjustable to enable the distance which it projects outward from the frame to be adjusted in accordance with the size of a person using the walker;

means attached to said frame for enabling movement of the frame;

support means suspended from the frame for holding a person, said support means comprising:

seat means removably attached to the frame for placement on a person prior to attachment to the frame; and

torso means comprising a garment suspended from said frame, for supporting the upper torso of a person.

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**4,941,498**

**CRUTCH ATTACHMENT**

**Richard J. Escallier, 4854 W. Cullom, Chicago, Ill. 60641**

**Filed Feb. 27, 1989, Ser. No. 316,414**

**Int. Cl.[5] A61H *03/02***

**U.S. Cl. 135—68** **3 Claims**

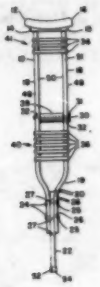
1. A crutch and carrier assembly for carrying an article on a crutch comprising,

(A) a crutch having a top and a bottom portion and a pair of parallel side rails between said top and said bottom portion, said side rails having outer surfaces and being spaced apart at a predetermined distance,

(B) a carrier including an elastic annulus having inner and outer surfaces and an inner circumference in its unstretched state, said circumference being less than twice said distance between said rails plus around said outer surfaces of said rails,

(C) only said inner surface of said annulus grippingly encircling said side rails and only one of either said inner surface or said outer surface of said annulus grippingly engaging the article, and

(D) the article being spaced from one of said side rails.



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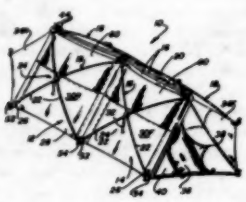
**4,941,499**

**GROUND TENT WITH EXTERNAL FRAME AND IMPROVED SUBFRAME THEREFOR**

**Bradley A. Pelsue, Englewood, and Mark R. Niksic, Lakewood, both of Colo., assignors to T. A. Pelsue Company, Englewood, Colo.**

**Filed Apr. 3, 1989, Ser. No. 332,791**
**Int. Cl.[5] E04H *15/40***
**U.S. Cl. 135—104** **8 Claims**



1. In a tenting structure:

a sidewall and roof assembly comprising a pair of inclined pliant erectile skin members each having external and internal surfaces and at least one common straight edge;

means interconnecting the skin members along their common straight edges wherein the erected skin members are adapted to be positioned so that the line defining their interconnection describes the vertex of the angle formed by the planes of the inclined skin members;

at least one frame means for supporting the skin members, each of which frame means includes;

a plurality of flexible struts; and

hub means carrying the proximal ends of the struts, including

a plurality of pivotal sockets carried by the hub to receive the proximal ends of the struts;

releasable stop means engaging the said sockets to arrest the movement thereof at the extremes of approximately 100° of rotation about the pivotal axis of the sockets;

a base member having a plurality of cavities, each having opposing side chambers defining bearing means at the forward end thereof;

journal means integral with the pivotal sockets and disposed for rotation in the bearing means; and

curvilinearly faced seats, one each disposed in the bottom of each cavity and engaging the pivotal sockets on the side thereof opposite the surface thereof engaging the bearing means;

a plurality of pocket means integral with the skin members and disposed along the perimeter of the surface thereof to receive the distal ends of the struts, the straightline distance between opposing pocket means being less than the diameter defined by the hub means and a pair of diametrically opposed flexible rods so as to place the said pair of rods in compression, creating an outwardly distended bow in the said rods.

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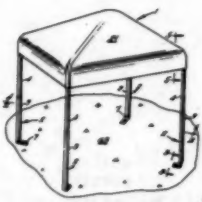
**4,941,500**

**KNOCKDOWN CANOPY SHELTER**

**Michael J. Emard, 187 Oar La., Roseburg, Oreg. 97470**

**Continuation of Ser. No. 920,652, Oct. 20, 1986, abandoned.**
**This application Jul. 13, 1988, Ser. No. 219,069**
**Int. Cl.[5] E04H *15/44, 15/46, 15/64***
**U.S. Cl. 135—106** **9 Claims**



1. A knockdown portable shelter comprising:

a frame including a centrally located connector and a plurality of supporting members, each having a rafter portion attached and extending radially outward from the connector, a vertically oriented pole portion, an arcuate portion curving downward from the rafter portion to the pole portion and forming a smooth transition joining the rafter portion and pole portion and a foot formed from a curved lower segment of the pole portion;

a flexible canopy adapted to stretch over the rafter and arcuate portions of the supporting members and cooperating with those portions to enhance the structural rigidity of the frame; and

means for securing the canopy to the frame;

whereby the canopy is tensioned by the movement of the pole portions radially outward from the connector due to the weight of the rafter portions and the connector.

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**4,941,501**

**SENSOR SYSTEM**

**Richard L. Bireley, San Diego, Calif., assignor to Aquametrics, Inc., San Diego, Calif.**

**Filed Feb. 6, 1989, Ser. No. 306,392**
**Int. Cl.[5] F16K *17/36***
**U.S. Cl. 137—78.3** **19 Claims**

1. In combination for controlling the watering of a patch of earth in accordance with the amount of moisture in the patch of earth,

a central station displaced from the patch of earth,

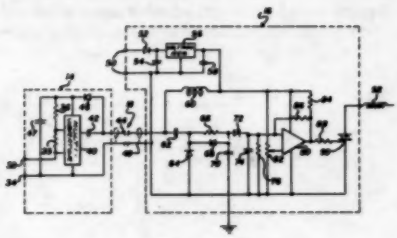
first means at the central station for providing a direct potential,

second means at the patch of earth for sensing the amount of moisture in the earth and for producing a capacitance having a value dependent upon the amount of such moisture,

a coaxial cable extending between the patch of earth and the central station,

third means at the central station for introducing the direct potential to the coaxial cable,

fourth means responsive at the patch of earth to the direct potential passing through the cable and responsive to the capacitance for producing signals at a frequency dependent upon the value of the capacitance and for introducing such signals to the coaxial cable,



fifth means responsive at the central station to the signals passing through the coaxial cable for producing a voltage related to the frequency of the signals, and

sixth means responsive at the central station to the voltage produced by the fifth means for controlling the watering of the patch of earth.

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**4,941,502**

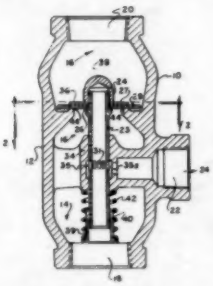
**LOW PRESSURE RECIRCULATION VALVE**

**George Loos, North Wales, and Horace J. Maxwell, Langhorne, both of Pa., assignors to Keystone International Holdings Corp., Wilmington, Del.**

**Filed May 31, 1989, Ser. No. 359,134**

**Int. Cl.[5] F04D *15/00***

**U.S. Cl. 137—116** **11 Claims**



1. A low pressure recirculating valve for cooling a centrifugal pump comprising;

a unitary valve casing having a first chamber for connection to a centrifugal pumping means and a second chamber for connection to a fluid outlet, said first chamber having a recirculation port for redirecting fluid from said first chamber to said centrifugal pump;

multiple piece check valve means situated between said first and second chambers for permitting fluid flow from said first chamber to said second chamber, said check valve means comprising a flat disk and a second disk transversely superimposed over said first disk whereby said disks can fit and be assembled within said unitary casing; said check valve means opening when the fluid pressure in said first chamber exceeds the fluid pressure in said second chamber and closing when the fluid pressure in the second chamber approaches that in that said first chamber; and

recirculation valve means coupled to said valve means for controlling the flow of fluid from said first chamber through said recirculation port, said recirculation valve impeding such flow when said check valve means is open and permitting such flow when said check valve means is closed.

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**4,941,503**

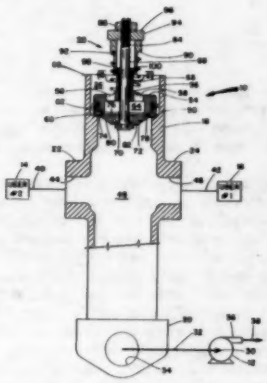
**VACUUM ASSEMBLY INCLUDING AN IMPROVED VACUUM RELIEF VALVE ASSEMBLY**

**Henry H. Huber, Jr., Amityville, N.Y., assignor to Air Techniques Incorporated, Hicksville, N.Y.**

**Filed May 13, 1988, Ser. No. 193,769**

**Int. Cl.[5] F16K *17/04***

**U.S. Cl. 137—454.2** **8 Claims**



1. A vacuum assembly for maintaining a uniform pressure level of vacuum under conditions of non-uniform fluid flow in a system which comprises:

a manifold housing defining a manifold chamber and having an outlet port, one or more inlet ports and a valve receiving chamber in fluid communication with said manifold chamber,

a vacuum source means in fluid communication with said outlet port of said manifold housing to place said manifold chamber under vacuum,

a user station in fluid communication via said inlet port with said manifold chamber of said manifold housing; and

a vacuum relief valve assembly disposed in said valve receiving chamber of said manifold housing and enclosing said manifold chamber and comprised of a valve body in which is slidably positioned a valve stem including a valve disc, said valve body defining a chamber and formed with a seating surface, dampening means for stabilizing vibration between said valve stem and said valve body, said valve disc being spring loaded and contacting said seating surface in line contact relationship, a variable area between said valve disc with said seating surface in an opened position being greater than an area defined at inception of fluid flow between said valve disc and said seating surface.

**4,941,504**

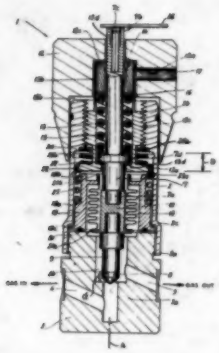
## MANUAL FLUID-CONTROL VALVE WITH LIMITED CLOSING PRESSURE

**Jacques Beauvir, Grand Rue 34 A, CH-2036 Cormondreche, Switzerland**

**Filed Jun. 27, 1989, Ser. No. 371,929**

**Int. Cl.[5] F16K *17/06***

**U.S. Cl. 137—524** **13 Claims**



1. A manual fluid-control valve comprising:

a housing extending along a longitudinal axis and defining a chamber formed with a seat and with a fluid inlet and a fluid outlet opening into the chamber at opposite sides of the seat;

a valve body in the housing having an end face and displaceable longitudinally forward into a closed position with the end face engaging the seat and blocking fluid flow through the chamber between the inlet and outlet and an open position with the end face spaced longitudinally backward from the seat and permitting fluid flow through the chamber between the inlet and outlet, the valve body having a longitudinally backwardly directed face;

an operating element formed as a sleeve centered on the axis, longitudinally displaceable in the housing around the valve body, out of direct contact with the valve body, and having a longitudinally forwardly directed face, the housing and operating element being formed with interengaging screwthreads centered on the axis, whereby rotation of the element on the housing axially and longitudinally relatively displaces the element and housing, the operating element including a cap forming an operating knob;

a stem projecting upward through and past the operating element and knob from the valve body; and

a spring braced between the faces of the operating element and the valve body and constituting the only longitudinal-force-transmitting link between the body and the operating element.

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**4,941,505**

## OIL SUPPLY SYSTEM FOR A BURNER NOZZLE INCLUDING MEANS FOR PREVENTING THE NOZZLE FROM DRIPPING

**Poul Kirkelund, Broager, and Jorn H. Klausen, Nordborg, both of Denmark, assignors to Danfoss A/S, Nordborg, Denmark**

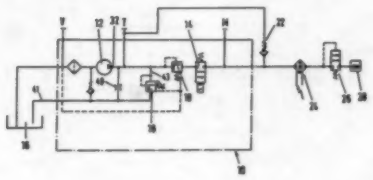
**Filed Apr. 10, 1989, Ser. No. 336,000**

**Claims priority, application Fed. Rep. of Germany, Apr. 29, 1988, 3814530**

**Int. Cl.[5] F16K *23/00***

**U.S. Cl. 137—563** **9 Claims**

1. An oil supply system for a burner nozzle, comprising an oil supply, a pump having a pressurized fluid outlet connected to the oil supply, a first fluid conduit connected to the outlet, a second fluid conduit adapted for connection to the nozzle, and first valve means for controlling the flow of fluid between the conduits, the first valve means being fluidly connected to the first and second conduits and including second valve means movable between a closed position to block fluid flow therethrough between the first and second conduits and an open position to permit pressurized fluid therethrough from the first conduit to the second conduit, third valve means in parallel to the second valve means and movable between a closed position



blocking fluid flow therethrough from the first conduit to the second conduit and an open position for opening under fluid pressure when fluid pressure in the second conduit is higher than that in the first conduit to permit flow therethrough from the second conduit to the first conduit, a return line, and fourth valve means connected to the first conduit to open to relieve excessive pressure in the first conduit by returning oil to the oil supply through the return line and to close when the excessive pressure in the first conduit has been relieved.

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**4,941,506**

## SANITARY MIXING VALVE

**Konrad Bergmann, Wittlich, Fed. Rep. of Germany, assignor to American Standard Inc., New York, N.Y.**

**Filed Apr. 7, 1989, Ser. No. 335,081**

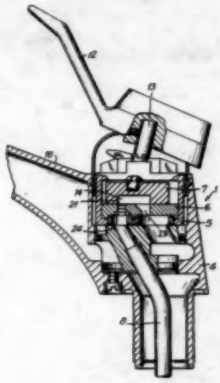
**Claims priority, application Fed. Rep. of Germany, Apr. 8, 1988, 3811708**

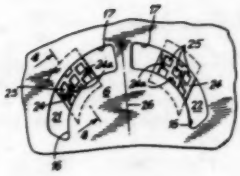
**Int. Cl.[5] F16K *11/074, 47/02***

**U.S. Cl. 137—625.4** **17 Claims**

1. A single-handle sanitary mixing valve comprising valve means including a stationary valve seat disc having hot and cold water inlet openings and an outlet opening, and a movable disc having a water mixing chamber formed therein positioned in face-to-face sealing contact therewith, and temperature attenuating means including a plurality of spaced-apart openings operatively coupled to each of said inlet openings, said spaced-apart openings formed in one of said attenuating means being symmetrical with respect to said spaced-apart openings in said other attenuating means so that when said mixing valve is in its operative mode, a relatively large movement of the handle produces only a relatively small change in mixed water

temperature, thereby achieving a greater temperature attenuation of mixed water, said temperature attenuating means being





an insert which nests within said not and cold inlet openings of said valve seat disc.

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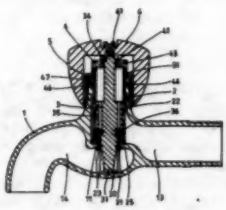
**4,941,507**

**WATER PRESSURE-SEALING FAUCET WITHOUT WATER HAMMER EFFECT**

**Chung-Shan Shenn, 32, Hoping Road, Hu Wei Town, Yun Lin Hsien, Taiwan**

**Filed Apr. 14, 1989, Ser. No. 338,730**
**Int. Cl.[5] F16K *11/02***
**U.S. Cl. 137—625.37** **5 Claims**



1. A water pressure-sealing faucet adapted to minimize water hammer action, comprising:

a faucet casing that includes an inlet pipe (13), an outlet pipe (14), and a communication opening (11) therebetween; a sleeve (2) located within said inlet pipe, a flow tube (21) extending from said sleeve through said communication opening; the juncture between said sleeve and tube defining an internal valve seat; a series of flow holes (22) spaced along the length of said sleeve for conveying liquid from the inlet pipe into the sleeve;

a cylindrical valve body (35) slidably engaging the inner surface of said sleeve for axial movement toward or away from said valve seat; a cylindrical pin (31) extending from said valve body through the aforementioned flow tube so that when the valve body is spaced axially from the valve seat liquid can flow from the flow holes through the flow tube along the side surface of the pin;

a sealing ring (36) carried on the valve body for sealing engagement with the valve seat to prevent liquid flow into the flow tube;

and a number of flow grooves (32) extending along the pin side surface, each flow groove having a progressively increasing cross section taken in a direction away from the sealing ring (36).

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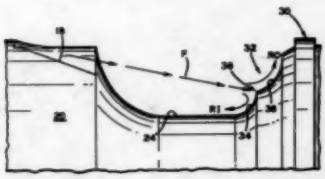
**4,941,508**

**FORCE BALANCED HYDRAULIC SPOOL VALVE**

**David R. Hennessy, Minneapolis, and Dennis H. Wenker, Afton, both of Minn., assignors to Dana Corporation, Toledo, Ohio**

**Filed Dec. 28, 1989, Ser. No. 458,105**
**Int. Cl.[5] F15B *13/04***
**U.S. Cl. 137—625.69** **10 Claims**



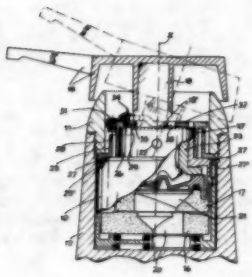
1. In a hydraulic valve assembly including a body having a generally cylindrical internal cavity and a plurality of hydraulic ports through said body, said cavity defining an axis, said ports communicating with said cavity and adapted to convey hydraulic fluid to and from said cavity, wherein said cavity contains a plurality of radially oriented fluid control lands and grooves, said assembly further comprising an axially moveable cylindrical spool supported within said cavity, said spool also containing radially oriented fluid control lands and grooves adapted to interface with said lands and grooves of said cavity, wherein the intermediate portion of said cavity comprises an open center core portion, said hydraulic ports being adapted to admit hydraulic fluid under pressure into said center core portion, an intermediate portion of said spool defining a central land bounded on each side by an immediately adjacent groove and a power land, each power land axially spaced from said central land by the distance of said associated adjacent groove, each opposed axially spaced power land including a centrally directed notch on an edge of said power land adjacent its respective adjacent groove, each notch being adapted to direct a hydraulic fluid stream across said adjacent groove to one side of said central land, each side of said central land comprising an opposed piston face shaped for controlling postimpact radial flow components of said fluid stream; an improvement comprising at least one of said piston faces including an inner radially concave annulus and an outer radially concave annulus together defining a convex split point annulus boundary between them, said split point annulus positioned relative to one of said notches so as to generate inversely directed radial flows across each of said annuli from said split point annulus.

4,941,509

## MIXING VALVE FOR HOT AND COLD WATER

Alessio Orlandi, Castiglione d/Stiviere, Italy, assignor to Galatron S.r.l., Castiglione d/Stiviere, Italy

Filed Aug. 21, 1989, Ser. No. 396,516
Claims priority, application Italy, Aug. 22, 1988, 5206 A/88
Int. Cl.[5] F16K *11/06, 51/00*
U.S. Cl. 137—625.17 4 Claims



1. A mixing valve for hot and cold water comprising:

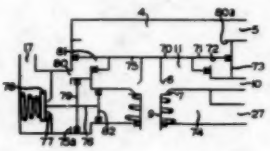
a cartridge body defining a valve space; hot and cold water outlet openings connected to said valve space; a first valve disk fixed in said cartridge body valve space and a second valve disk displaceably positioned within said valve space; a control lever for displacing said second valve disk, said cartridge body having a vertical axis, said control lever swinging about an axis transverse to said vertical axis; clamping ring means for fixing said cartridge body into a tap; temperature setting means connected to said control lever for limiting rotation of said control lever around the vertical axis, said temperature control means including a bush having angularly spaced shoulders, said bush being fixed to said cartridge body, a setting ring disposed concentric to said bush and connected to said control lever for rotation with said control lever, a stop screw fitted to said setting ring for cooperation with said shoulders to limit the rotation of said lever, said stop screw being fixed inside an arc-shaped slot recessed in said setting ring; and, volume rate of flow limiting means connected to said lever for limiting the movement of said lever about said transverse axis to limit the volume rate of flow of water, said volume rate of flow limiting means including a slide gate positioned on said setting ring, said slide gate including an opening, said control lever passing through said opening of said slide gate, a cross member connected to said slide gate, said slide gate and said cross member being displaceable with respect to said slide ring and said control lever, said slide gate including a slot, a screw positioned in said slot and fixable relative to said setting ring for fixing said slide gate and said cross member relative to said setting ring to limit the movement of said control lever about said transverse axis.

4,941,510

## RELAY VALVE FOR PNEUMATIC OR HYDRAULIC APPLICATION

Gerhard Fauck, Hanover; Wolfgang Pohl, Garbsen, and Helmut Ulrich, Springe, all of Fed. Rep. of Germany, assignors to WABCO Westinghouse Fahrzeugbremsen GmbH, Hanover, Fed. Rep. of Germany

Division of Ser. No. 828,927, Feb. 12, 1986, which is a continuation of Ser. No. 679,420, Dec. 7, 1984, abandoned. This application Oct. 30, 1989, Ser. No. 428,547
Claims priority, application Fed. Rep. of Germany, Dec. 12, 1983, 3344841
Int. Cl.[5] F16K *21/00*
U.S. Cl. 137—627.5 4 Claims



1. A relay valve for a pneumatic brake installation for vehicles, comprising:

(a) an inlet valve having a control connection which is pressurized with a control pressure and having at least one supply connection which is pressurized by supply pressure and which is put in communication with at least one working connection;

(b) an outlet valve for connecting the working connection to the atmosphere;

(c) said inlet valve and said outlet valve being operated by a relay piston which can be pressurized by the control pressure to move the inlet valve in the opening direction and to move the outlet valve in the closing direction and being operated by the relay piston which can be pressurized in the closing direction by the working pressure supplied to a reaction chamber which is connected to the working connection to move the inlet valve and in the opening direction to move the outlet valve;

(d) means which provides a graduated increase of the working pressure beyond the value corresponding to the delivered control pressure, up to the available supply pressure; and

(e) said means is activated above a predetermined pressure value of a second control pressure.

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4,941,511

## DEVICE WITH A VALVE FUNCTION

Trond V. Johansen; Ola Ruch, both of Trondheim; Ludvig Naess, Tiller; K. P. Kristjansson, Skjetnehaugen, and S. F. Utengen, Flataasen, all of Norway, assignors to Den norske stats oljeselskap a.s, Norway

PCT No. PCT/NO87/00054, § 371 Date May 6, 1988, § 102(e) Date May 6, 1988, PCT Pub. No. WO88/00313, PCT Pub. Date Jan. 14, 1988
PCT Filed Jul. 8, 1987, Ser. No. 170,386
Claims priority, application Norway, Jul. 9, 1986, 862775
Int. Cl.[5] F16L *55/10;* F16K *7/10*
U.S. Cl. 138—89 7 Claims

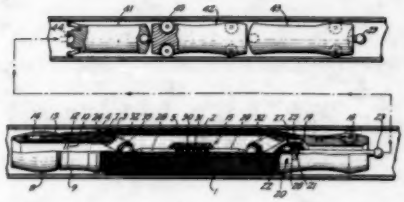
1. A device with valve function which can be brought into and out of a pipeline, and be parked in the pipeline over long periods of time as a safety valve during operation of the pipeline, the device comprises:

a first section comprising a valve which in uninfluenced position being kept in centered open position by centering springs (22) for allowing normal fluid flow through said device and being closed automatically and instantly when

the differential pressure of the normal fluid flow acting on the first section exceeds a predetermined limit,

a second section comprising a parking brake/packing sealing unit consisting of an elastomer hose which can be brought to bear tight agaisnt the wall of the pipeline by means of being compressed in the radial direction of the device, causing the parking brake/seal packing (9) to expand in axial direction,

a cylindrical wire anchor connecting the first and second sections and consisting of at least one layer of high-grade wire (2) which outwards borders to the pipeline wall, and inside comprise a fluid-tight elastomer layer (5) where both layers (2, 5) at each end of the cylindrical wire anchor are attached on the first and second sections respectively, said cylindrical wire anchor being urged against the pipeline wall as a consequence of the differential pressure acting against the first section when the valve is closed,



a shaft (15) being disposed within said wire anchor and installed with spring action means for movement in an axial direction to compensate for contraction thereof which arises due to the increased differential pressure to urge the wire anchor outwardly against the wall of the pipeline to provide for sufficient contact between the wire anchor and the pipeline wall, thereby providing additional brake means for preventing movement of said device and said shaft is connected with rigid linkage means (32) for connecting the ends of the shaft (15) with the first and second sections, and

a channel for communicating the normal fluid flow through the first section, the cylindrical wire and the second section.

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**4,941,512**

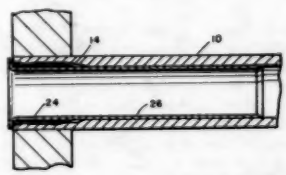
## METHOD OF REPAIRING HEAT EXCHANGER TUBE ENDS

**Kevin W. McParland, Fairfield, Conn., assignor to CTI Industries, Inc., Fairfield, Conn.**

**Continuation of Ser. No. 271,158, Nov. 14, 1988, abandoned, which is a continuation of Ser. No. 97,665, Sep. 15, 1987, abandoned. This application Jul. 25, 1989, Ser. No. 384,972**

**Int. Cl.[5] F16L *1/00***

**U.S. Cl. 138—97** **3 Claims**




1. The method of repairing a tube having a damaged inlet end supported in a tube sheet by a tube to tube sheet joint in a heat exchanger comprising the steps of:

inspecting inlet end of said tube for determining the condition of the end of the tube;

cleaning the inlet end of said tube by removing loose metal, debris and corrosion to bare metal when a damaged inlet end is found;

installing a metallurgically compatible metal insert in the damaged inlet end of said tube, said insert having an upstream insert end adjacent said inlet end of said tube and a downstream insert end spaced from said inlet end;

non-welding securing said insert along its entire length in said tube without welding said insert in said tube by non-explosively, controllably roller expanding the insert along its entire length within said tube to substantially minimize any end step on the downstream end of said insert, improve the tube to tube sheet joint strength, and prevent overexpansion of the damaged tube and insert to avoid fracturing the tube or insert; and

flaring the upstream end of said insert to the existing tube profile.

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**4,941,513**

## METHOD FOR REMOVING AN INCORRECT PIECE OF WEFT THREAD FROM A SHED

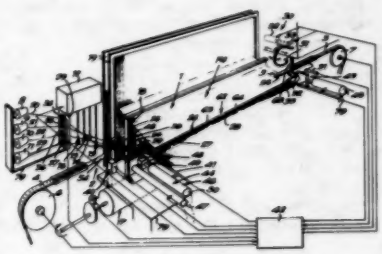
**Henry Shaw, Vleteren, Belgium, assignor to Picanol N.V., Ieper, Belgium**

**Filed Mar. 10, 1989, Ser. No. 321,832**

**Claims priority, application Belgium, Mar. 10, 1988, 8700271**

**Int. Cl.[5] D03D *47/30, 51/00***

**U.S. Cl. 139—116.2** **15 Claims**



1. A method for removing from a fell line in a shed of a weaving machine an incorrect weft thread which is not bound in by warp threads and which extends across a length of the shed to a first end of the shed, comprising the steps of:

a. inserting a pulling thread into the shed from said first end of the shed and transporting the pulling thread through the shed, starting from a position near said first end of the shed, by means of a carrying element having a thread clip which clamps the thread during transport until the pulling thread extends over the entire length of the shed, after which the pulling thread is unclamped, said pulling thread being connected to the incorrect weft thread such that the pulling thread and incorrect weft thread form a loop when the pulling thread is extended over the entire length of the shed; and

b. guiding the pulling thread around a thread guide element situated adjacent a second end of the shed opposite said first end by drawing, from said first end of the shed, the pulling thread together with the loose weft thread in such a way that the loose weft thread is released from the fell line in the form of a loop, guided around said thread guide element, transported back through the shed towards said first end, and removed form the shed at said first end.

**4,941,514**

## MULTI-WEFT PAPER MACHINE CLOTH WITH INTERMEDIATE LAYER SELECTED TO CONTROL PERMEABILITY

**Seppo Taipale, Siilinjärvi, Finland, assignor to Tamfelt Oy Ab, Tampere, Finland**

**Continuation of Ser. No. 35,460, Apr. 7, 1987, abandoned. This application Jul. 5, 1989, Ser. No. 376,898**

**Claims priority, application Finland, Feb. 10, 1987, 870537**

**Int. Cl.[5] D03D *15/00***

**U.S. Cl. 139—383 A** **14 Claims**

1. A multi-layer paper machine cloth having a single system of longitudinal warp threads and a multiple system of transverse weft threads, and a pre-selected permeability value, said transverse weft threads comprising:

a surface layer including a first plurality of weft threads having a first thickness;

a lower layer including a second plurality of weft threads having a second thickness; and

an intermediate layer including a third plurality of weft threads having a third thickness, said intermediate layer being between said surface layer and said lower layer and said warp threads being interlaced with an woven to bind the surface, intermediate and lower weft layers, said third thickness being selected relative to said first and second thicknesses so that the overall permeability of the cloth is at said preselected permeability value.

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**4,941,515**

## LASHING MACHINE

**Jörgen Vrenning, Ejdervägen, Huddinge, Sweden**

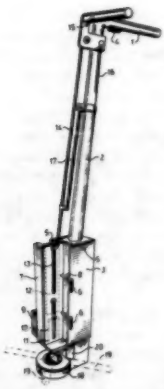
**PCT No. PCT/SE87/00368, § 371 Date Feb. 17, 1988, § 102(e) Date Feb. 17, 1988, PCT Pub. No. WO88/01671, PCT Pub. Date Mar. 10, 1988**

**PCT Filed Aug. 21, 1987, Ser. No. 319,765**

**Claims priority, application Sweden, Aug. 27, 1986, 8603613**

**Int. Cl.[5] B21F *15/04***

**U.S. Cl. 140—119** **12 Claims**



1. A lashing machine for lashing together mutually crossing elongated members with the aid of U-shaped wire ties, and particularly for lashing together reinforcement rods, said apparatus comprising a magazine (9) for ties (10); means (12) for dispensing ties singly from the magazine in a manner such that respective ties can be caused to engage over two mutually crossing elongated members at their mutual point of intersection; and a head (18) for receiving, holding and twisting together the limbs of respective U-shaped ties (10), characterized in that the head (18) comprises two mutually opposing pivotable jaws (23) which define therebetween a slot-like opening for receiving the limbs of respective ties (10) and which can be swung in a swinging movement relative to one another in a manner to reduce the width of the slot-like opening so as to grip the limbs of the tie therebetween; means for retaining said jaws stationary during said swinging movement of said jaws; and means for rotating the jaws about a common axis in the closed position of said jaws, in a manner to twist together the limbs of the tie held between said jaws.

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**4,941,516**

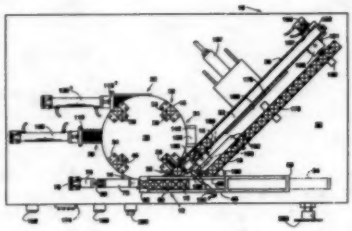
## METHOD AND APPARATUS FOR STRAIGHTENING THE PINS OF A PIN GRID ARRAY

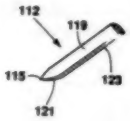
**Klaus D. Weiswurm, 818 E. Myrtle St., San Antonio, Tex. 78212**

**Filed Oct. 20, 1988, Ser. No. 260,602**

**Int. Cl.[5] B21F *1/02***

**U.S. Cl. 140—147** **21 Claims**






1. An apparatus for straightening the pins of a pin grid array comprising:

means for positioning a pin grid array having a plurality of nominally parallel pins extending from the wafer thereof at a plurality of stations for performing pin straightening operations;

means for loading the pin grid array into said positioning means;

means for combing the pins of the pin grid array, said combing means comprising at least one plurality of parallel elongate members for insertion in close proximity to the wafer between the pins of the pin grid array;

said combing means comprising means for inserting the elongate members in close proximity to the wafer between the pins in first and second directions with respect to the pin grid array while the pin grid array is positioned in at least one of the stations by said positioning means and, once inserted between the pins, moving the elongate members outwardly away from the wafer of the pin grid array to comb the pins thereof;

means for fine straightening the pins of a combed pin grid

array when the combed pin grid array is positioned by said positioning means at another of the stations, said fine straightening means including a member having a plurality of holes for receiving the pins of the combed pin grid array and means for moving said pin receiving member toward and away from the wafer of the combed pin grid array, each of said holes having a funnel-shaped profile for fine straightening of a pin received therein; and

means for unloading a pin grid array having straightened pins extending therefrom from said positioning means.

**20**. An apparatus for use in straightening the pins of a pin grid array comprising:

a rake; and

a plurality of tines mounted to said rake in an arrangement selected so as to allow said tines to be inserted between the nominally parallel pins of a pin grid array in close proximity to the wafer thereof;

each said tine having an end a top, a bottom, and first and second convex side surfaces between the top and bottom; the end of each said tine being pointed; and the top of each said tine being broader than the bottom thereof for facilitating the passage of said tine between the pins in close proximity to the wafer with the top of each tine facing the wafer and then downwardly through the pins in a direction away from the wafer.

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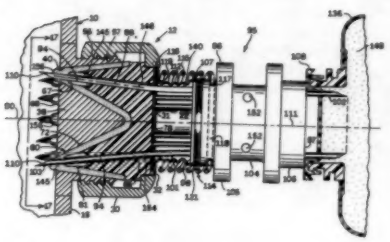
**4,941,517**

## ASEPTIC FLUID TRANSFER APPARATUS AND METHODS

**Edwin J. Galloway, Menasha, Wis., assignor to Galloway Trust, Neenah, Wis.**

**Filed Oct. 20, 1988, Ser. No. 261,020**
**Int. Cl.[5] G01N *1/12*; B65D *41/20***
**U.S. Cl. 141—1** **74 Claims**



**9**. A fluid receiver fitting, comprising:

(a) a resiliently deformable seal member, said seal member comprising (i) a first outer surface of said fitting, said first outer surface comprising a seal means, and (ii) a first inner surface of said fitting, said first inner surface comprising a first central portion, a first upstanding wall portion, and a penetration zone between said first central portion and said first upstanding wall portion, said first outer surface comprising a plurality of separate and distinct seal elements opposing, and aligned with, said penetration zone, each said seal element forming a downwardly extending projection from said seal means, said projections defining an array thereof, a second upstanding wall portion extending outwardly from said bottom portions, and a second central surface portion extending inwardly and upwardly of said bottom portions,

the composition of said seal member between said penetration zone and said bottom portions comprising a pierceable, self-closing material; and

(b) a channel member, said channel member comprising a second outer surface and a second inner surface of said fitting, said second inner surface comprising a first channel member surface portion in contact with said penetration zone, said channel member having needle guide channels extending from said second outer surface toward said first channel member surface portion, said needle guide channels being oriented and positioned such that needles inserted into said channels from said second outer surface pass, along paths, through said channels, said penetration zone, and said plurality of separate and distinct seal elements of said seal member, each said path passing through a different one of said seal elements.

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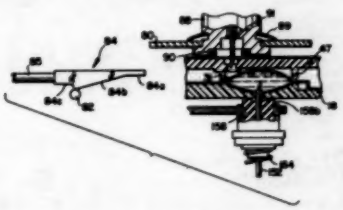
**4,941,518**

## FLUID INJECTION SYSTEM

**Harold R. Williams, Capistrano Beach, and Robert M. Spencer, San Juan Capistrano, both of Calif., assignors to Johnson & Johnson Medical, Inc., Arlington, Tex.**

**Filed May 20, 1987, Ser. No. 52,698**
**Int. Cl.[5] B67C *9/00***
**U.S. Cl. 141—1** **12 Claims**



**1**. A method of injecting liquid into a chamber, comprising:

positioning, adjacent to the chamber, a closed unpressurized at least partially flexible container having a known quantity of liquid therein, and including a flexible wall;

temporarily connecting said container to said chamber through a valve;

forcing liquid out of said container, by compressing said container to open said valve, including applying pneumatic pressure to the exterior of said container in a manner to cause the pneumatic pressure to move the flexible wall against an opposite wall of the container and thereby force the liquid out of said container, and into said chamber; and

maintaining a vacuum in said chamber during said connecting and forcing steps.

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**4,941,519**

## LIQUID FEED SYSTEM USING A NON-REUSABLE CONTAINER

**Joseph T. Sestak, and Robert W. Childers, both of Erie, Pa., assignors to American Sterilizer Company, Erie, Pa.**

**Filed Aug. 19, 1988, Ser. No. 233,776**
**Int. Cl.[5] B65D *49/00*; B65B *3/04***
**U.S. Cl. 141—22** **15 Claims**

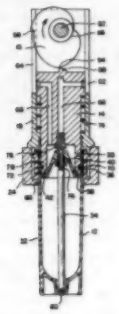
**13**. A container for use with an apparatus for dispensing a liquid into equipment having an inlet port, said container comprising:

a top portion having an opening therethrough for receiving a member for fluidly connecting the container to the inlet port of the equipment; and

a bottom portion for holding the liquid;

means extending from said opening into said bottom portion for permitting the liquid to exit said bottom portion when said member is received within said opening, said exit permitting means being removably positioned in said

opening to permit said exit permitting means to be disconnected from said opening to render said exit permitting



means permanently ineffective for passing liquid from said bottom portion.

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**4,941,520**

**FORMULATING PASTY MATERIALS**

**Martin E. Dowzall, 299 Village Pl., Wyckoff, N.J. 07481, and Vazgen J. Houssian, 389 Mountain Rd., Union City, N.J. 07087**

**Continuation-in-part of Ser. No. 863,978, May 16, 1986. This application Aug. 18, 1987, Ser. No. 87,006**

**Int. Cl.[5] B65B** *35/28;* **B01F** *11/00;* **G55B** *1/00*

**U.S. Cl. 141—114** **9 Claims**

1. Apparatus for formulating pasty materials comprising:

a set of supply containers each containing a pasty material and each having an extrusion nozzle;

at least one receiving tube, each of said at least one receiving tube being adapted to fit on each extrusion nozzle; and

means for estimating the amount of material extruded from a selected container of said set into one of said at least one receiving tube when said at least one receiving tube is fitted on one of said extrusion nozzles; and

each of said at least one receiving tube being of flexible material to allow material extruded into said at least one receiving tube to be ejected from said at least one receiving tube by application of a traveling pinching action along said at least one receiving tube and wherein said set of supply containers each contain basic color components from which a pasty material of desired color may be obtained by mixture of specific proportions of two or more of said components, said proportions fro a single color being determined in a single receiving tube.

**4,941,521**

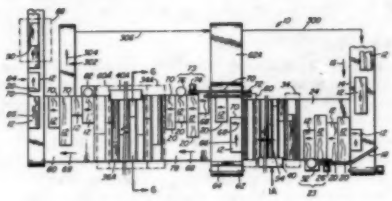
**FINGER JOINTING GREEN LUMBER**

**Alfred W. J. Redekop, Langley, and Derek Barnes, Vancouver, both of Canada, assignors to MacMillan Bloedel Limited, Vancouver, Canada**

**Filed Oct. 3, 1989, Ser. No. 416,634**

**Int. Cl.[5] B27F** *1/00*

**U.S. Cl. 144—347** **34 Claims**



1. A method of finger jointing green lumber pieces wherein a first set of fingers is formed at one longitudinal end of each piece and a second set of fingers is formed at the other longitudinal end of said piece, said method comprising applying heat substantially solely to said first set of fingers to dry said first set of fingers and heat said one longitudinal end of each said piece in a first drying station, applying heat substantially solely to said second set of fingers to dry said second set of fingers and heat said opposite end of each said lumber piece in a second drying station, applying a thermosetting adhesive to one of said first and second sets of fingers, crowding said first set of fingers on one of said lumber pieces into a mating relationship with said second set of fingers on an adjacent lumber piece with said adhesive therebetween to form a joint in an assembly station, said one lumber piece and said adjacent lumber piece having their longitudinal axes substantially in alignment to form said joint, curing said adhesive in said joint by transferring heat energy applied to said one and said adjacent pieces in said first and second drying stations from said fingers to said adhesive in a time period so that said lumber pieces leave said first drying station said joint is formed in said assembly station and said adhesive is cured to secure said joint before migration of moisture from said pieces into said joint can interfere with said curing of said adhesive.

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**4,941,522**

**TIRE**

**Mitsuo Sakurai, Hiratsuka, Japan, assignor to The Yokohama Rubber Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 119,456, Nov. 10, 1987, abandoned. This application Oct. 5, 1988, Ser. No. 253,452**

**Claims priority, application Japan, Nov. 17, 1986, 61-175331**

**Int. Cl.[5] B60C** *13/02*

**U.S. Cl. 152—523** **2 Claims**

1. A rubber tire having a bar code stamped with a bar code plate into a sidewall portion thereof during vulcanization of a green tire, said bar code comprising a pair of side edges equally spaced one from the other and joined by semi-circular ends and a plurality of alternating grooves and ribs of varying widths wherein said ribs are formed at the same height level as said side portion of said tire and merge into said side portion of said tire at said side edges of said bar code whereby the surface of

said ribs is continuous with the surface of said side portion of said tire.

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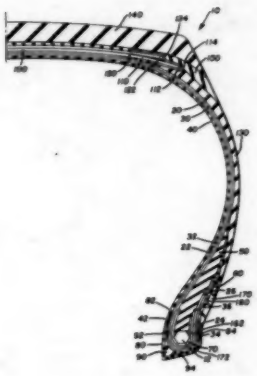
4,941,523

## PNEUMATIC TIRE

Richard L. Galante, Akron; Terry J. Waibel, Wadsworth, and Terrell D. Windham, Hartville, all of Ohio, assignors to The Goodyear Tire & Rubber Company, Akron, Ohio

Filed Feb. 23, 1989, Ser. No. 313,784
Int. Cl.[5] B60C *15/06, 21/04*
U.S. Cl. 152—543 2 Claims



1. A pneumatic tire comprising:

a pair of axially spaced apart annular tensile members;

one or more continuous carcass plies extending between the annular tensile members, each carcass ply comprising cords selected from the group consisting of steel cords and polyester cords, each carcass ply having a central portion and lateral edge portions, each of the lateral edge portions being folded axially and radially outwardly around one of said annular tensile members;

a belt structure comprising a plurality of belt plies reinforced with steel cords disposed radially outwardly of the carcass plies;

an air-impermeable line forming an inside surface of the tire with each edge of the liner disposed radially outwardly and axially inwardly of the associated annular tensile member;

a layer of air-permeable rubber reinforced with nylon cord is disposed in the area of each annular tensile member extending from a first edge located axially inward and radially outward of the associated annular tensile member such that said layer of air permeable rubber is in overlapping relationship with said liner toward said annular tensile member, the layer of air-permeable rubber being folded axially radially outwardly around said annular tensile member such that a second edge of the layer of air-permeable rubber is disposed axially outwardly of the carcass plies; and

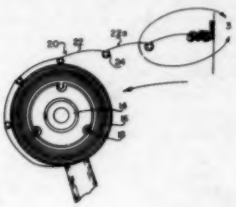
a cordless air-impermeable gum strip interposed between the layer of air-permeable rubber and the carcass plies, the gum strip extending from a first edge disposed radially outward and axially inward of the associated annular tensile member to a second edge disposed radially inward of said annular tensile member, the first edge of said air permeable gum strip being disposed radially outward of the associated edge of said air-impermeable liner.

4,941,524

## AWNING HINGE

Bradley G. Greer, Irvine, Calif., assignor to A & E Systems, Inc., Santa Ana, Calif.

Filed Jul. 28, 1988, Ser. No. 226,186
Int. Cl.[5] E04F *10/06*
U.S. Cl. 160—67 7 Claims



1. In combination for attachment to a recreational vehicle having a retaining member,

awning fabric,

a metallic cover for the fabric, the metallic cover being formed from a plurality of slats hinged relative to one another pivotable into a first relationship for housing the awning fabric and pivotable into a second relationship to provide an unwinding of the fabric, the slat at one end of the cover being attached to the awning fabric, the slat at the other end of the cover being provided with a retainer member,

a first member having first and second detaining portions at opposite ends of the first member, the detaining portion at-the first end of the first member being detained by the retaining member on the slat at the other end of the cover and the detaining portion at the second-. end of the first member being detained by the retaining member on the recreational vehicle, and

a second member coupled to the first member and having a flap disposed relative to the slat at the other end of the cover to seal the slat against water leakage with the cover in the open relationship.

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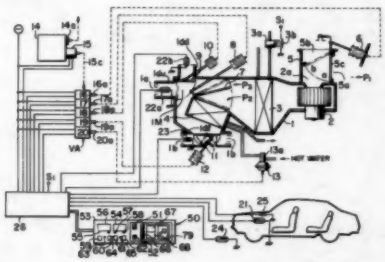
4,941,525

## AUTOMOTIVE AIR CONDITIONER

Toshikazu Ito, and Tsuneo Kagohata, both of Ibaraki, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 761, Jan. 6, 1987, abandoned. This application Nov. 23, 1988, Ser. No. 275,680
Claims priority, application Japan, Jan. 10, 1986, 61-2078
Int. Cl.[5] F25B *29/00*
U.S. Cl. 165—12 2 Claims



1. An air-conditioner mounted on a vehicle comprising:

a blower means for delivering air into a passenger room;

a heater core through which hot water circulates to heat the air from said blower means;

an air mixing door disposed for adjusting a mixture ratio between cold air flowing in a bypass passage bypassing said heater core, and hot air to be directed to said heater core;

an outside temperature sensor for generating a first signal in response to the outside temperature;

a passenger room temperature setter for generating a second signal in response to a set passenger room temperature;

a passenger room temperature sensor for generating a third signal in response to a passenger room temperature;

a fourth signal generating means for generating a fourth signal representative of a desired passenger room temperature in response to at least said second signal;

a first arithmetic means for calculating a desired blown air temperature under a calculation model programmed in a ROM of a microcomputer on the basis of only said first and said second signals;

a second arithmetic means for calculating a desired blow air flow of said blower means on the basis of said second and said third signals; and

means for controlling operation and non-operation of a compressor operatively associated with an evaporator upstream of the heater core on the basis of ambient temperature;

means for adjusting a blown air temperature on the basis of a difference between said fourth signal and said third signal when said difference equals or exceeds an absolute predetermined value, and for selecting, when such difference is below said absolute predetermined value, a blown air temperature obtained in advance on the basis of a thermal load of the passenger room, in accordance with arithmetic results of said first arithmetic means, and means for adjusting a blow air flow on the basis of said second arithmetic means.

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**4,941,526**

## DEVICE FOR REGULATION OF THE FLOW OF AN OPERATIVE MEDIUM

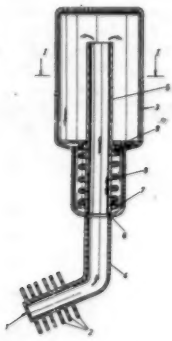
**Hans-Ove Nilsson, KÅllered, Sweden, assignor to AB Volvo, Goteborg, Sweden**

**Filed Feb. 11, 1988, Ser. No. 146,374**

**Claims priority, application Sweden, May 15, 1986, 8602214**

**Int. Cl.[5] F28D *15/02***

**U.S. Cl. 165—32** **5 Claims**



1. A device for regulation of the transfer of heat in a heat pipe means of an operative medium contained therein, said heat pipe comprising a heat-emitting condenser element, a heat-absorbing evaporator element and a continuously open interconnecting conduit joining two elements together for flow of vapor from said evaporator element to said condenser element, return conduit means extending from said condenser element to said evaporator element for return of condensed liquid thereto, said regulator device comprising a valve seat formed in said return conduit and a valve body cooperating with said valve seat to open and close a valve opening formed between said valve body and said valve seat, and a member consisting of a configuration memory alloy in the form of the helical spring surrounding and connected to the valve body and which is arranged to alter its configuration upon the attainment of a predetermined temperature and in doing so, cause the valve body to open or close the valve opening.

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**4,941,527**

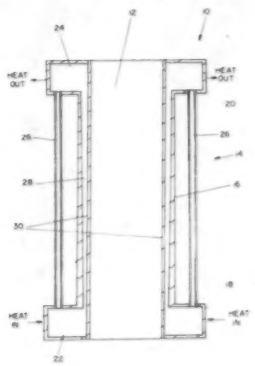
## HEAT PIPE WITH TEMPERATURE GRADIENT

**Jerome E. Toth, Hatboro, and Donald M. Ernst, Leola, both of Pa., assignors to Thermacore, Inc., Lancaster, Pa.**

**Filed Apr. 26, 1989, Ser. No. 343,594**

**Int. Cl.[5] F28D *15/02***

**U.S. Cl. 165—47** **14 Claims**




8. A heat pipe furnace with a temperature gradient over a portion of its length comprising:

a sealed casing wrapped around and enclosing a volume which is a heated zone, non-condensible gases being evacuated from the casing;

a vapor passage located adjacent to the surface of the casing which is adjacent to the heated zone, the vapor passage extending over the length of the heated zone and being of such a restricted cross sectional area to develop a temperature gradient over the length of the vapor passage;

a vaporizable fluid within the sealed casing;

a heat source which applies heat to the sealed casing adjacent to one end of the heated zone; and

a heat sink which removes heat from the sealed casing adjacent to the end of the heated zone remote from the heat source.

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**4,941,528**

## CEILING MADE OF METAL PANELS

**Donald Herbst, Marienplatz 11, D-1000 Berlin 45, Fed. Rep. of Germany**

**Filed Jul. 15, 1988, Ser. No. 219,659**

**Claims priority, application Fed. Rep. of Germany, Jul. 15, 1987, 3723792**

**Int. Cl.[5] F28D *7/08***

**U.S. Cl. 165—56** **12 Claims**

1. A room ceiling comprising:

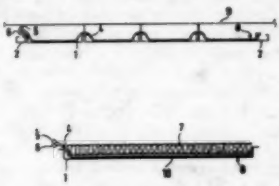
ceiling panels attachable together along adjacent edges;

a supporting structure for supporting said panels in a desired configuration to form a ceiling;

tubular pipes being above, and in direct contact with said panels, said pipes having a flowable medium passing there-

through, said pipes being formed of flexible tubes disposed closely adjacent one another to form flexible mats of said tubular pipes;

wherein said pipes possess a degree of flexibility such that said pipes will bend under their own weight to conform to the desired configuration of the ceiling;



wherein said flowable medium has characteristics for heatin and cooling; and

wherein a predetermined room temperature may be achieved.

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**4,941,529**

**PROCESSING APPARATUS FOR VISCOUS MATERIALS**

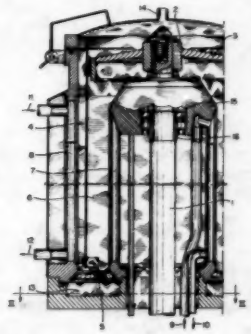
**Jort Boer, Vorden, Netherlands, assignor to N.V. Machinefabriek Terlet, Zutphen, Netherlands**

**Filed Aug. 10, 1988, Ser. No. 230,419**

**Claims priority, application Netherlands, Aug. 13, 1987, 8701906**

**Int. Cl.[5] F28F *17/00***

**U.S. Cl. 165—94** **2 Claims**



1. A processing apparatus for viscous materials, comprising:

innermost and outermost concentric circular cylindrical walls bounding a vertically disposed annular space, said annular space having a radial width, viscous materials to be processed being fed in at the bottom of the annular space and processed viscous materials being removed at the top of the annular space,

a vertically disposed rotating shaft at the centre line of the circular cylindrical walls, said rotating shaft having a top and a bottom, the top of said rotating shaft being mounted in a wall and sealed with respect thereto, said wall in which the top of the rotating shaft is mounted sealing off the top of the innermost circular cylindrical wall,

a multiplicity of essentially radial arms which are attached to the shaft above the wall in which the top of the rotating shaft is mounted, and

vertical components attached to ends of said radial arms, said vertical components traveling around in the annular space as the shaft rotates, an inlet through which the materials to be processed are fed in debouching tangentially into an annular chamber beneath the annular space, said inlet having a width extending in a radial direction of the annular chamber, said annular chamber having a radial width which is greater than the width of the inlet and greater than the radial width of the annular space.

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**4,941,530**

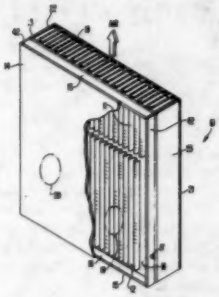
**ENHANCED AIR FIN COOLING ARRANGEMENT FOR A HERMETICALLY SEALED MODULAR ELECTRONIC COLD PLATE UTILIZING REFLUX COOLING**

**Lawrence E. Crowe, Lindenwood, Ill., assignor to Sundstrand Corporation, Rockford, Ill.**

**Filed Jan. 13, 1989, Ser. No. 296,820**

**Int. Cl.[5] F28D *15/02*; H01L *23/42***

**U.S. Cl. 165—104.33** **6 Claims**



1. A modular reflux cooling plate, for one or more heat generating components, comprising:

at least one condensing region;

boiling channels disposed adjacent the at least one condensing region;

at least one downcomer in the vicinity of the boiling channels so as to be operatively communicated between the at least one condensing region and the boiling channels;

end plates hermetically sealing the at least one condensing region, the boiling channels and the at least one downcomer therebetween so that a coolant can be provided in the region of the boiling channels, and

means for supplying cooling air from the boiling channels to the at least one condensing region arranged adjacent one of the end plates to define a cooling circuit defined by the boiling channels, the at least one condensing region, and the at least one downcomer,

wherein the one or more heat generating components are mounted externally on the other of the end plates adjacent the boiling channels to form an assembly adapted to be joined with one or more other modular reflux cooling plates with assemblies thereon for providing shared heat exchange between the at least one condensing region and the cooling air supply means,

wherein the at least one condensing region comprises a condensing region above and below the boiling channels.

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**4,941,531**

**INTERNAL COMBUSTION ENGINE RADIATOR**

**Igor Moisseeff, Myrtle Bank, Australia, assignor to Moisseeff Advanced Technology, Limited, Perth, Australia**

**Filed Nov. 3, 1988, Ser. No. 266,778**

**Int. Cl.[5] F28D *21/00***

**U.S. Cl. 165—125** **10 Claims**

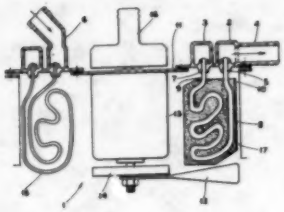
1. A cylindrical heat exchanger, particularly for the cooling of an internal combustion engine,

one end of the heat exchanger being provided with a pair of concentric manifolds, one of said manifolds being an inner

manifold and radially spaced from the other manifold which is an outer manifold;

a water inlet connected to one of the manifolds and a water outlet connected to the other manifold;

a plurality of radially spaced heat exchange members extending longitudinally of the heat exchanger between said pair of manifolds and the other end of said heat exchanger, each said heat exchange member having a water flow path therein;



said flow path having an inlet and an outlet;

said inlet being connected to said one manifold and said outlet being connected to said other manifold; and

an axial flow fan at said outer end of said heat exchanger and mounted axially thereof to cause a flow of air to pass longitudinally of said heat exchanger over said heat exchange members and out through an opening adjacent to said two manifolds.

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**4,941,532**

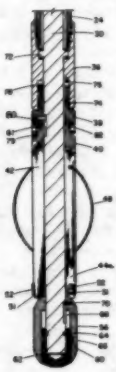
**ANCHOR DEVICE**

**Floyd R. Hurt, and Lawrence W. Berger, both of Belfield, N. Dak., assignors to Elder Oil Tools, Yorktown, Tex.**

**Filed Mar. 31, 1989, Ser. No. 331,290**

**Int. Cl.[5] E21B *23/00***

**U.S. Cl. 166—216** **11 Claims**



1. Anchor means for retaining a pipe member in a fixed position in a well bore traversing earth formations where the anchor means is sized to pass through a smaller diameter well bore and to be anchored to a wall in a lower, larger diameter well bore comprising,

an elongated anchor supporting member with an upper coupling end adapted for coupling to a pipe member and a lower terminal end,

an expander member attached to said terminal end of said anchor supporting member, said expander member having adjacently located, lengthwise extending, first inclined expander surfaces and second inclined expander surfaces where said first and said second inclined expander surfaces respectively have different angles of inclination relative to a central longitudinal axis for said anchor supporting member,

an annular arm support member slidably mounted relative to said anchor supporting member for longitudinal movement of said arm support member between a first contracted position and a second extended position,

elongated arm members pivotally connected at one end to said arm support member so that the other end of said arm members can be moved radially outwardly from said anchor supporting member, said arm members being circumferentially disposed about said arm support member, said arm members having adjacently located, lengthwise extending, inner first and second inclined surfaces with different angles of inclination relative to the longitudinal axis for an arm member,

wall engaging friction means coupled to said arm support member for frictionally engaging the wall of a well bore,

wall engaging means on said arm members for gripping engagement with the wall of a well bore, and

release means including a housing member rotatively coupled to said supporting member and threadedly coupled to said arm support member for selectively moving said arm support member between said first contracted position and said second extended position upon rotation of said housing member so that said first and second inclined arm surfaces on said slip members selectively engage said first and second inclined expander surfaces on said expander member and move said wall engaging means between a retracted condition and an extended condition radially outward and in gripping engagement with a wall of a well bore, said release means being operable upon rotation on an opposite direction for moving said wall engaging means from an extended condition to a retracted condition.

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**4,941,533**

**SUBTERRANEAN PERMEABILITY MODIFICATION BY USING MICROBIAL POLYSACCHARIDE POLYMERS**

**Clarence S. Buller, and Shapour Vossoughi, both of Lawrence, Kans., assignors to The University of Kansas, Lawrence, Kans.**

**Filed May 16, 1989, Ser. No. 352,733**

**Int. Cl.[5] E21B *33/138, 43/22, 43/27, 47/00***

**U.S. Cl. 166—252** **105 Claims**

1. In a method for enhanced recovery of hydrocarbon fluids by the injection of a flooding fluid into a subterranean hydrocarbon fluid bearing formation through an injection well extending from the surface of the earth into the formation, to displace in situ hydrocarbon fluids from the formation towards at least one production well spaced at a distance away from the injection well, the improvement which comprises:

(1) first injecting a quantity of acidic water into the said formation through said injection well,

(2) thereafter injecting a quantity of reversibly gelable, water insoluble, alkaline beta 1,3 polyglucan homopolymer solution, which solution gels immediately upon one of neutralization and acidification thereof, into said injection well and

(3) thereafter injecting a drive fluid into said injection well and producing at least some hydrocarbon fluids from the said production well.

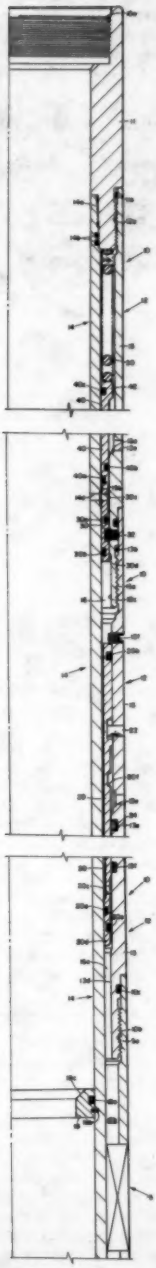
99. A process of selectively blocking the migration of fluids in a permeable, porous, earth formation body having hydrocarbon fluids therein comprising injecting into said body one of a mineral acid and an organic acid and thereafter injecting into said body an alkaline medium containing regelable polysaccharide polymer whereby the latter medium, in at least part thereof, is neutralized by the contact with said acid, such resulting in precipitation of at least some of the said polymer in said body.

4,941,534

## METHOD AND APPARATUS FOR SEALING A CASING IN A SUBTERRANEAN WELL BORE

Vel Berzin, Houston, Tex., assignor to Baker Hughes Incorporated, Houston, Tex.

Filed Apr. 28, 1989, Ser. No. 345,441
Int. Cl.[5] E21B *33/13, 34/10*
U.S. Cl. 166—285 7 Claims



1. Apparatus for sealing a casing in a subterranean well bore, comprising, in combination:

a tubular valving assemblage attachable to the the casing;

said tubular valving assemblage comprising concentric inner and outer tubular bodies defining an elongated annular chamber therebetween;

port means in said inner tubular body communicating with the bore of said casing, whereby an inflation fluid supplied through said casing can enter said annular chamber through said port means;

an inflatable packer secured to the tubular valving assemblage and having a fluid inlet passage communicating with said annular chamber;

first sleeve valve means disposed in said annular chamber above said fluid inlet passage;

said first sleeve valve means having an upper position permitting pressured inflation fluid to flow into said fluid passage means to inflate said inflatable packer and a lower position preventing fluid flow into said fluid passage means;

first shearable means securing said first valve means in said upper position; and

seal means on said first sleeve valve means cooperating with one at least wall of said annular chamber to produce an upwardly facing piston area, whereby an increase in the inflation fluid pressure resulting from filling the inflatable packer will produce a downward force on said first sleeve valve to move same to said lower position.

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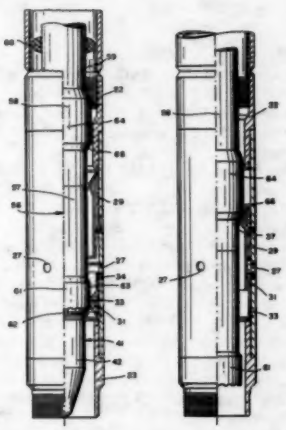
4,941,535

## MANUAL PORT CLOSING TOOL FOR WELL CEMENTING

Gary L. Porter, and William B. Cade, both of Hobbs, N. Mex., assignors to Texaco Inc., White Plains, N.Y.

Division of Ser. No. 258,929, Oct. 17, 1988, Pat. No. 4,850,432.
This application Jan. 17, 1989, Ser. No. 297,214
Int. Cl.[5] E21B *33/14*
U.S. Cl. 166—285 3 Claims



1. In a method for cementing a cased well, wherein a cementing staging collar forms an integral part of the well casing, said staging collar including:

a casing defining means forming a chamber having axially aligned inlet port and primary discharge port respectively for conducting a cement flow through said means forming said chamber, and a secondary discharge port in said

casing between said inlet port and said primary discharge ports, a multi-segment sleeve operably retained in said means forming said chamber, one sleeve segment of said multi-segment sleeve being longitudinally dispalceable to affect a closure across said secondary discharge port to preclude cement flow therethrough, said casing having been at least partially cemented to the extent of substantially filling said means forming said chamber with hardenable cement, the improvement therein of

providing a sleeve segment actuating tool—having at least one cutter means depending from the lower end thereof, and being engageable with means for rotating and advancing said sleeve segment actuating tool into the casing—

concurrently rotating and advancing said sleeve segment actuating tool to erode a passage through hardened cement in the staging collar means forming said chamber, and

contacting said one sleeve segment with said actuating tool to displace said sleeve segment into closed relationship with said secondary discharge port.

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**4,941,536**

## SET RETARDED CEMENT COMPOSITIONS AND METHODS FOR WELL CEMENTING

**Lance E. Brothers, Ninnekah; Donald W. Lindsey, Marlow, and Dralen T. Terry, Duncan, all of Okla., assignors to Halliburton Company, Duncan, Okla.**

**Filed Jun. 27, 1989, Ser. No. 372,976**
**Int. Cl.[5] E21B *33/138, 33/14***
**U.S. Cl. 166—293** **12 Claims**

6. A method of cementing a zone in a subterranean formation penetrated by a wellbore comprising the steps of:

forming a pumpable set retarded cement slurry comprising hydraulic cement, fresh water, particulate silica having a particle size in the range of from about 0.02 to about 0.5 micron and a set retarder comprising a copolymer consisting essentially of 2-acrylamido, 2-methylpropane sulfonic acid (AMPS) and acrylic acid having an average molecular weight below about 5000 and comprising from about 40 to about 60 mole percent AMPS;

pumping said cement slurry into said zone by way of said wellbore, and

allowing said cement slurry to set therein.

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**4,941,537**

## METHOD FOR REDUCING THE VISCOSITY OF AQUEOUS FLUID

**Paul W. Langemeier; Martha A. Phelps, and Michael E. Morgan, all of Louisville, Ky., assignors to Hi-Tek Polymers, Inc., Jeffersontown, Ky.**

**Continuation of Ser. No. 160,142, Feb. 25, 1988, abandoned. This application Jun. 22, 1989, Ser. No. 371,651**
**Int. Cl.[5] E21B *43/26***
**U.S. Cl. 166—308** **24 Claims**

1. A process for reducing the viscosity of aqueous fluid thickened with a tertiary amino polygalactomannan wherein the tertiary amino group substituted on the polygalactomannan is derived from a dialkylaminoalkyl halide or a dialkylaminoalkyl epoxide wherein the alkyl groups of said halide or said epoxide contain from 1 to 6 carbon atoms and wherein the total number of carbon atoms in the alkyl groups does not exceed 12 which comprises adding to the aqueous fluid an alkali metal or an alkaline earth metal salt of hypochlorous acid or a chlorinated isocyanurate.

13. A process for fracturing a subterranean formation penetrated by a borehole which comprises injecting into the borehole and into contact with the formation at a rate and pressure sufficient to fracture said formation a water-based fluid comprising:

(a) an aqueous liquid;

(b) as a thickening agent to increase the viscoity of the aqueous liquid a viscosity increasing amount of a tertiary amino polygalactomannan wherein the tertiary amino group substituent on the polygalactomannan is derived from a dialkylaminoalkyl halide or a dialkylaminoalkyl epoxide wherein the alkyl groups of said halide or said epoxide contain from 1 to 6 carbon atoms and wherein the total number of carbon atoms in the alkyl groups does not exceed 12; and

(c) as a breaker to reduce the viscosity of the fluid after said fluid has contacted the formation and after its intended purpose as a viscous fluid has been served an effective amount of an alkali metal or alkaline earth metal salt of hypochlorous acid, or a chlorinated isocyanurate.

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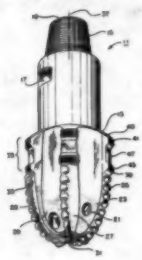
**4,941,538**

## ONE-PIECE DRILL BIT WITH IMPROVED GAGE DESIGN

**William W. King, Spring, Tex., assignor to Hughes Tool Company, Houston, Tex.**

**Filed Sep. 20, 1989, Ser. No. 409,706**
**Int. Cl.[5] E21B *10/46***
**U.S. Cl. 170—329** **6 Claims**



1. A single piece drill bit for use in drilling a borehole in an earthen formation, comprising:

a body including a solid bit face on one end and a shank on the opposite end with means for connection to a drill string for rotation about a longitudinal axis, the bit face increasing in external diameter between a nose and a gage region, the gage region terminating in a shoulder adjacent the bit shank;

an upper stabilizing region of full gage diameter cutter elements positioned adjacent the bit shoulder in the gage region of the bit;

a lower stabilizing region of full gage diameter cutter elements spaced apart axially on the bit face from the upper stabilizing region, the lower stabilizing region also being in the gage region of the bit;

an undercut region located on the bit face between the upper and lower stabilizing regions, the undercut region being selectively sized to minimize contact of the gage region with the borehole wall, thereby increasing the effective gage length of the bit without increasing the total contact area of the bit face with the wall of the borehole being drilled.

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**4,941,539**

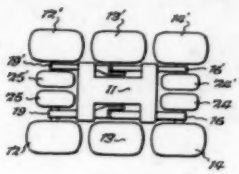
## ALL-TERRAIN VEHICLE

**John F. Kopczynski, 1671 Sweeney St., North Tonswanda, N.Y. 14120**

**Filed Mar. 3, 1989, Ser. No. 319,127**
**Int. Cl.[5] B62D *61/10***
**U.S. Cl. 180—22** **16 Claims**

1. A vehicle comprising a body, elongated links having outer end portions, pivot means mounting said elongated links on opposite sides of said body, inner and outer sides on said elongated links, main wheel mounted outwardly of said outer side of each of said outer end portions of said elongated links,

auxiliary wheel means, and means mounting said auxiliary wheel means inwardly of said inner side of each of said elongated links to engage objects which lie in the path of said



auxiliary wheels, said auxiliary wheel means being of smaller diameter than said main wheels so as not to engage the ground unless said objects are in the path of said auxiliary wheel means.

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**4,941,540**

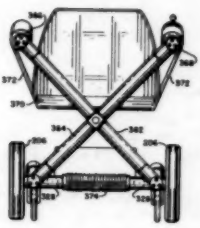
## UNIVERSAL ELECTRIC WHEELED CHAIR

**Lawrence A. Bernstein, 6456 Surfside Way, Malibu, Calif. 90265**

**Continuation of Ser. No. 924,895, Oct. 30, 1986, Pat. No. 4,825,971, which is a continuation-in-part of Ser. No. 691,168, Jan. 14, 1985, abandoned. This application Feb. 28, 1989, Ser. No. 317,194**

**Int. Cl.[5] A61G *5/02***

**U.S. Cl. 180—65.1** **8 Claims**



1. A lightweight electric powered wheeled chair comprising:

a tubular wheeled chair frame having two front and two rear wheels mounted on said frame,

first and second small high speed motors each weighing less than two pounds mounted in alignment with and coupled to said rear wheels;

a plurality of flashlight type battery cells mounted in said tubular frame;

electric circuit means for applying power from said battery cells to said motors;

said tubular frame including two lower side frame members, two rear frame members, pivotally connected together intermediate their ends to form an "X" configuration, with the lower ends of each of said rear frame members being pivotally secured to said lower side frame members, two forwardly extending upper side members mechanically coupled to the upper ends of said rear frame members, and a seat supported from said forwardly extending upper side members; and

means included in said wheeled chair assembly for permitting said rear frame members to pivot downwardly to a substantially horizontal and parallel position to form a collapsed configuration;

whereby the lightweight and collapsible configuration of said wheeled chair makes it easy to transport.

**4,941,541**

## DEVICE FOR DISTRIBUTING DRIVE POWER IN THE DRIVE TRAIN OF A FOUR WHEEL DRIVE VEHICLE

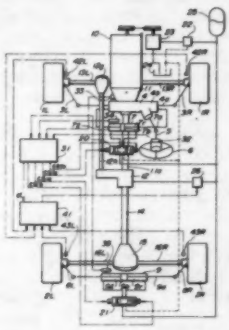
**Hideo Ito, Zushi, and Masatsugu Yokote, Yokohama, both of Japan, assignors to Nissan Motor Co., Ltd., Yokohama, Japan**

**Filed Oct. 7, 1988, Ser. No. 254,875**

**Claims priority, application Japan, Oct. 8, 1987, 62-254218; Oct. 8, 1987, 62-254219**

**Int. Cl.[5] B60K *17/34***

**U.S. Cl. 180—140** **6 Claims**



1. In a four wheel drive train for an automotive vehicle:

an auxiliary steering device for providing auxiliary steering of at least one of said front and rear wheels, said auxiliary steering device being responsive to a manually induced steering angle of the front wheels in a manner to vary the amount of auxiliary steering produced by said auxiliary steering device;

auxiliary steering control means for controlling said auxiliary steering device;

sensor means for sensing a steering condition which is induced by the amount a yaw rate is increased by said auxiliary steering device;

a device for distributing driving torque from a prime mover between the forward and rear wheels of the vehicle;

a device for controlling said torque distribution device; and

means for correcting the amount of driving torque which is supplied to the front wheels by said torque distributing device, said correcting means being responsive to said sensor means in a manner wherein when sensor means senses a steering condition wherein the ease with which yaw can be induced changes, the amount by which said driving torque distribution device distributes driving torque between the front and rear wheels is changed relative to the torque distribution before one of the auxiliary steering and the yaw rate varies in a manner to avoid sudden changes in the steering characteristics of the vehicle.

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**4,941,542**

## AUTOMOTIVE FOUR WHEEL STEERING SYSTEM

**Atsuo Tomoda; Takaaki Itoh, and Takao Kijima, all of Hiroshima, Japan, assignors to Mazda Motor Corporation, Hiroshima, Japan**

**Continuation of Ser. No. 101,687, Sep. 28, 1987, abandoned. This application Jun. 7, 1989, Ser. No. 363,432**

**Claims priority, application Japan, Oct. 1, 1986, 61-235037; Oct. 2, 1986, 61-235020**

**Int. Cl.[5] B62D *6/02***

**U.S. Cl. 180—140** **8 Claims**

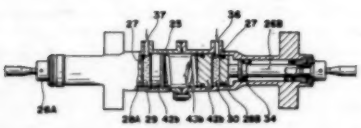
1. In an automotive vehicle having front and rear wheel pairs and a steering wheel drivingly coupled with the front wheel pair for steering the vehicle with respect to the direction of run of the vehicle, said steering wheel being rotatable in

opposite directions from a neutral position at which the vehicle can run straightforward, a fluid-operated, four wheel steering system which comprises:

a front wheel steering mechanism including a front steering rod that is adapted to steer the front wheel pair in response to rotation of the steering wheel;

a fluid-operated front cylinder means actuated in response to the rotation of the steering wheel from the neutral position, said front cylinder means including a front piston member that is mechanically coupled to the front steering rod for movement in response to rotation of the steering wheel, said front cylinder means having first and second front cylinder chambers positioned on opposite sides of said front piston member, said first front cylinder chamber having a volume that is adapted to be reduced when the steering wheel is rotated to turn the front wheel pair leftwards with respect to the direction of movement of the vehicle, and the second front cylinder chamber having a volume that is adapted to be reduced when the steering wheel is rotated to turn the front wheel pair rightwards with respect to the direction of movement of the vehicle;

a fluid-operated rear cylinder means for steering the rear wheel pair for turning at least one rear wheel of the rear wheel pair with respect to the direction of straightforward run of the vehicle, said rear cylinder means including a first rear cylinder assembly and a second rear cylinder assembly, said first rear cylinder assembly being adapted to cause a right-hand rear wheel of the rear wheel pair to turn when supplied with a fluid medium and said second




rear cylinder assembly being adapted to cause a left-hand rear wheel of the rear wheel pair to turn when supplied with a fluid medium;

said front and rear wheel pairs being adapted to turn in the same direction;

a fluid passage means for operatively coupling the front and rear cylinder means together to permit a fluid medium to be supplied from the front cylinder means to the rear cylinder means to thereby actuate the rear cylinder means, said fluid passage means including a first fluid passage that communicates the first front cylinder chamber with the first rear cylinder assembly for supplying fluid medium under pressure to the first rear cylinder assembly and a second fluid passage that communicates the second front cylinder chamber with the second rear cylinder assembly for supplying fluid medium under pressure to the second rear cylinder assembly; and

a fluid medium accommodating means disposed in the rear cylinder means for accommodating a portion of the fluid medium being supplied from the front cylinder means to the fluid-operated rear cylinder means only when the pressure of the fluid medium in the front cylinder means increases such that the pressure in the rear cylinder means increases to a value greater than a predetermined value as a result of rotation of the steering wheel when the automotive vehicle is traveling at relatively low speeds, said fluid medium accommodating means being operable to accommodate a portion of the fluid medium independent of the turn of the rear wheel pair.

**4,941,543**

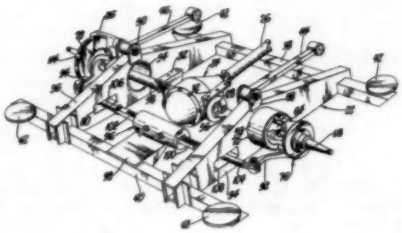
**REAR WHEEL SUSPENSION AND STEERING SYSTEM**

**James G. Ewen, Royal Oak, Mich., assignor to DLMA Transportation Inc., Troy, Mich.**

**Filed Dec. 23, 1988, Ser. No. 289,027**

**Int. Cl.[5] B60K *17/30***

**U.S. Cl. 180—254** **2 Claims**



1. A rear wheel support and driving system of the type comprising a rack-type dead axle (22) adapted to support a vehicle body thereupon through suitable spring means, a air of wheels (30) rotatably supported upon said dead axle, a differential drive mechanism (24) adapted to be supported upon the vehicle body and movable with said body relative to the dead axle, the differential mechanism including a power input shaft (26) and power output shafts (28 and 30), a pair of live axles (56 and 58) drivingly connecting the output shafts with said wheels, the dead axle being generally rectilinear in shape and having a first pair of longitudinal beams (34 and 36) respectively transversely spaced outboard of said differential mechanism, a second pair of cross beams (38 and 40) respectively spaced fore and aft of said differential mechanism and secured to the first pair of beams, the improvement comprising:

A. said longitudinal beams (34 and 36) including transversely aligned openings (52 and 54);

B. hollow sleeves (72 and 74) secured within the beam openings (52 and 54) and projecting transversely outboard of beams (34 and 36), said live axles (56 and 58) extending through said sleeves;

C. means (76 and 78) for steerably supporting the wheels upon the sleeves; said supporting means including a steering arm (92–94) fixed thereto and operatively connected to the power steering device (96);

D. a power steering device (96) mounted on the dead axle and operatively connected to the steerable wheel supporting means (76 and 78) for imparting steering movement to the wheels, the power steering device (96) includes a pair of operating arms (100 and 102) extending generally parallel to the cross beam (40), rod members (104 and 106) articulated at their ends between said operating arms and the steering arms (92 and 94), each longitudinal beam (34–36) includes a second opening (108–110) intermediate the first opening (52–54) and the dead axle cross beam (40), the rod members (104 and 106) respectively extending through the second openings whereby the outer end of each rod member is disposed outboard of the associated longitudinal beam (34 and 36).

**4,941,544**

## BEARING ARRANGEMENT FOR A DRIVE ASSEMBLY OF A MOTOR VEHICLE

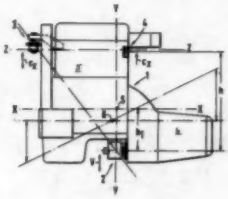
**Rüdiger Fischle, Leonberg, and Ulrich von Broock, Hoxter, both of Fed. Rep. of Germany, assignors to Dr. Ing.h.c.F. Porsche AG, Fed. Rep. of Germany**

**Filed May 30, 1989, Ser. No. 358,405**

**Claims priority, application Fed. Rep. of Germany, May 30, 1988, 3818302**

**Int. Cl.[5] B60K** *5/04, 5/12*

**U.S. Cl. 180—292** **4 Claims**



1. A bearing arrangement for a drive assembly of a motor vehicle which is held on a body side of the vehicle comprising:

a central bearing means arranged below a horizontal plane extending through a center of gravity of the drive assembly;

a torque support means arranged above the horizontal plane, the central bearing means and the torque support means being arranged approximately at a common vertical transverse plane extending through the center of gravity; and

a support bearing means held on a front end of the assembly and supported with respect to the vehicle body;

wherein the central bearing means is arranged below the center of gravity and in a low-vibration area of the drive assembly, the central bearing means being a single bearing which absorbs substantially an entire static load of the drive assembly;

wherein the torque support means is arranged with respect to the central bearing means at a base distance which corresponds to approximately an overall height of the drive assembly, and with the central bearing means being located substantially at the vertical plane extending through the center of gravity; and

wherein the support bearing means, with respect to a front view of the vehicle, is arranged diagonally opposite the central bearing means at a vertical longitudinal plane extending through the center of gravity.

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**4,941,545**

## MUFFLER ASSEMBLY

**Richard C. Wilcox, Columbus; James Allman, North Vernon, and Stacy Smith, Franklin, all of Ind., assignors to Arvin Industries, Inc., Columbus, Ind.**

**Filed Apr. 28, 1989, Ser. No. 345,141**

**Int. Cl.[5] F01N** *1/02, 1/08, 7/18*

**U.S. Cl. 181—282** **22 Claims**

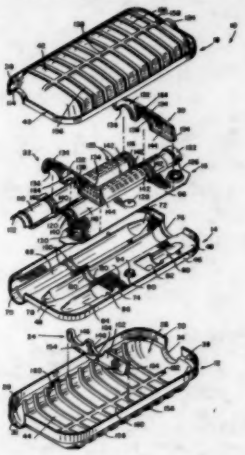
1. A muffler assembly comprising

a first shell half,

a second shell half attached to the first shell half at a perimetrically extending split line to define a muffler chamber therebetween, the first and second shell halves cooperating to define a flange-receiving space therebetween at the split line, an inlet port for admitting exhaust gas into the muffler chamber, and an outlet port for expelling exhaust gas from the muffler chamber,

a first tuning plate disposed in the muffler chamber, the first tuning plate having a flange edge trapped in the flange-receiving space to retain the first tuning plate in a fixed position dividing the muffler chamber into a first chamber between the first tuning plate and the first shell half and a second chamber between the first tuning plate and the second shell half,

a second tuning plate disposed in the second chamber, the second tuning plate cooperating with the first tuning plate to define exhaust gas-conducting tubes connected to the muffler chamber inlet and outlet,



means for attaching the second tuning plate to the first tuning plate to provide the exhaust gas-conducting tubes and to retain the second tuning plate in mating engagement with the first tuning plate without extending into the flange-receiving space at the split line so that only the first shell half, second shell half, and first tuning plate are rigidly joined together at the split line.

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**4,941,546**

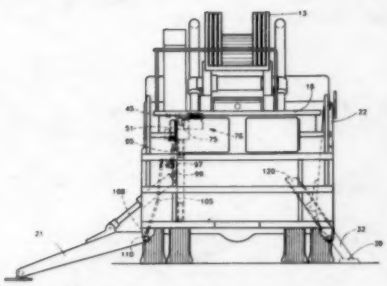
## AERIAL LADDER ROTATION LIMITER

**Thomas R. Nist, Princeton, W. Va., and Edward V. Garnett, Huntington Beach, Calif., assignors to Figgie International Inc., Willoughby, Ohio**

**Filed Feb. 7, 1989, Ser. No. 307,898**

**Int. Cl.[5] E06C** *5/00*

**U.S. Cl. 182—17** **17 Claims**



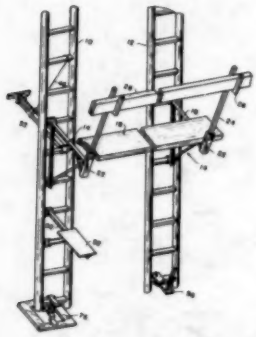
1. Aerial apparatus comprising a platform, vertically extendible means mounted on said platform, said platform being rotatable to position said vertically extendible means for use at a desired circumferential location, stabilizing means extendible outwardly of said platform for stabilizing said vertically extendible means within a predetermined circumferential sector, and means responsive to extension of said stabilizing means for permitting said vertically extendible means to be positioned only within said predetermined circumferential sector.

**4,941,547**

## SAFETY FEATURED LADDER SCAFFOLDING

**Lester R. Livick, 15106 Beatty St., San Leandro, Calif. 94579**

**Filed Sep. 25, 1989, Ser. No. 411,900**
**Int. Cl.[5] E06C** *1/04, 5/36, 7/44*
**U.S. Cl. 182—107** **12 Claims**



1. A wall supported scaffold formed of first and second ladders each having a lower end and a top end and a plurality of substantially equally spaced rungs, said ladders being spaced apart with their top ends leaning against a common wall, said scaffold including:

a ladder jack secured by rung locking means to each of said ladders, said jack having a substantially horizontal platform plank supporting member; and

an antiflexing brace coupled between a rung on each of said ladders and the common wall, said brace having a tubular member with first and second ends, the first end of said tubular member being pivotally secured by rung locking means to a rung of its ladder, a second member having first and second ends, the first end of said second member being slideable into bore in the second end of said tubular member, the second end of said second member supporting a wall pad for contacting said common wall, and an adjustment member overlying said tubular member and attached to the second end of said second member for adjusting and locking the overall length of said antiflexing brace.

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**4,941,548**

## FALL ARRESTING DEVICE FOR CLIMBERS

**Mark W. Blanchard, P.O. Box 8030, Mammoth Lakes, Calif. 93546**

**Filed Nov. 17, 1989, Ser. No. 438,578**
**Int. Cl.[5] A62B** *1/20*
**U.S. Cl. 182—234** **16 Claims**

1. A fall arresting device comprising:

a housing,

a drum,

means for rotatably mounting said drum within said housing,

a centrifugal clutch means which halts rotation of said drum with respect to said housing when said drum reaches a predetermined rate of rotation,

a clove hitch knot formed in a rope and tied around said drum, whereby said device may slide freely along said

rope at less than a predetermined rate of travel yet lock securely to said rope when said rate of travel is attained.

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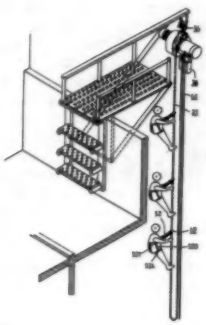
**4,941,549**

## FIRE ESCAPE APPARATUS

**Liou Da-Tan, and Chang Shiou-Hney, both of No. 23, Lane 43, Da-Pong Rd., Taichung, Taiwan**

**Filed Sep. 19, 1989, Ser. No. 409,204**
**Int. Cl.[5] A62B** *1/10, 35/00*
**U.S. Cl. 182—234** **20 Claims**



1. A fire escaping apparatus comprising:

a main housing having a first end, a second opposite end and a through housing hole, and capable of being held attached to a place from where relevant persons can escape a fire;

a hollow active shaft rotatably mounted in said housing hole;

a following shaft rotatably mounted in said active shaft, and having a third end and a fourth opposite end;

a driving member secured on said active shaft and rotatably mounted in said housing hole;

an escaping loop rope capable of positively circulating on a periphery, of said driving member and of being suspended thereunder to be within easy reach of a ground surface for one of said persons;

a speed-increasing mechanism mounted between said active and following shafts for enabling said following shaft to rotate at a speed higher than that of said active shaft; and

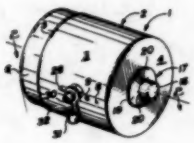
a speed-limiting mechanism mounted on said fourth end for limiting said speed of said following shaft under a predetermined value so that said one person grasping on said rope can be rapidly safely transported from said place to said ground surface.

4,941,550

## BEARING LUBRICATING DEVICE

Kenneth D. Blake, Rt. 2 Box 723B, Winnfield, La. 74183

Filed Apr. 24, 1989, Ser. No. 342,549
Int. Cl.[5] F16C *1/24*; F16N *11/04*
U.S. Cl. 184—5.1 49 Claims



1. A bearing lubricating device for lubricating wheel bearings, comprising a generally cylindrically-shaped housing adapted to contain a lubricant, said housing having a closed end and an open end provided in communication with the wheel bearings; piston means slidably disposed in said housing, with one end of said piston means slidably projecting from said closed end of said housing; bias means provided in said housing, said bias means engaging said piston means for biasing said piston means inwardly of said housing and forcing the lubricant into contact with the wheel bearings; and a lubricant fitting seated in said housing for selectively introducing fresh lubricant into said housing.

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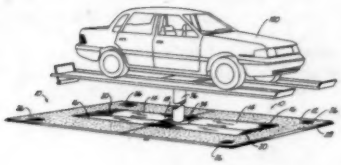
4,941,551

## VEHICLE SERVICE AREA FLOOR MAT

Douglas L. Visser, 4305 Highway 200 East, Sandpoint, Id. 83864

Filed May 19, 1989, Ser. No. 354,382
Int. Cl.[5] F16N *31/00*
U.S. Cl. 184—106 12 Claims



1. A service area mat for use on a floor in a vehicle maintenance area, said mat comprising:

a rectangular shaped body portion having a top, a bottom and edges;

a textured apron area disposed inwardly of the edges of the top of said body portion;

a center recessed portion disposed inwardly from said apron area and being tapered downwardly toward a low end of said body portion;

fluid collecting means disposed at said low end of said center portion; and

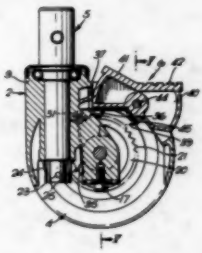
a plurality of projections extending downwardly from said bottom of said body portion.

4,941,552

## CASTOR WITH BRAKE MECHANISM

Stafford T. Screen, Stourbridge, England, assignor to Colson Castors (Europe) Limited, West Midlands, United Kingdom

Filed Oct. 7, 1988, Ser. No. 255,830
Claims priority, application United Kingdom, Oct. 21, 1987, 8724678
Int. Cl.[5] B60B *33/00*
U.S. Cl. 188—1.12 17 Claims



1. A castor comprising:

a body,

at least one castor wheel carried by said body for rotation about a generally horizontal wheel axis,

a mounting member, said body being carried on said mounting member for swivelling about a generally vertical axis spaced from said wheel axis,

a first series of brake teeth on said castor wheel and a second series of teeth on said mounting member, and an integrally formed resilient brake member having first and second detent portions, said brake member being selectively movable between a braking position and a release position, wherein said first and second detent portions resiliently engage said first and second series of teeth respectively to brake said castor against body swivelling and wheel rotation and in said braking position said first and second detent portions are spaced from said first and second series of teeth.

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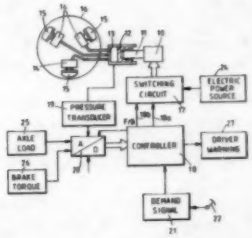
4,941,553

## VEHICLE BRAKING SYSTEM

Anthony W. Harrison, Birmingham, England, assignor to Lucas Industries, Birmingham, United Kingdom

Filed Nov. 18, 1988, Ser. No. 273,341
Claims priority, application United Kingdom, Nov. 20, 1987, 8727290; Jan. 19, 1988, 8801089; Jan. 19, 1988, 8801068
Int. Cl.[5] B60T *8/62*
U.S. Cl. 188—156 12 Claims




1. A braking system comprising a rotating part, a friction element for cooperating with said rotating part to provide braking, a motor having an output member for controlling said

friction element, and a control circuit for receiving a variable demand signal, said motor comprising a stator and a rotor which is arranged to be brought to rest at any one of a plurality of distinct positions, said control circuit controlling said motor so as to drive said output member to a position in accordance with the variable demand signal and to provide automatic adjustment of a datum position of said friction element to compensate automatically for wear thereof.

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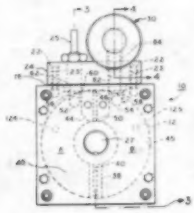
**4,941,554**

## HYDRAULIC TORQUE RESISTANCE DEVICE

**Phillip A. Sollami, 1300 E. Pine, Herrin, Ill. 62948**

**Filed Jan. 13, 1989, Ser. No. 296,680**
**Int. Cl.[5] F01C *9/00*; F16F *9/14***
**U.S. Cl. 188—310** **8 Claims**



1. Apparatus for applying an adjustable resistance to the rotation of a shaft, said apparatus comprising in combination

housing means enclosing a generally cylindrical bore,

said shaft extending through said bore along the central longitudinal axis thereof,

stator means extending radially between said shaft and the wall of said bore,

a vane affixed to said shaft and sealed to said wall of said bore to provide a first chamber between one side of said vane and one side of said stator and to provide a second chamber between the other side of said vane and the other side of said stator,

hydraulic fluid filling said first and second chambers,

first and second passageways opening respectively into said first and second chambers,

adjustable valve means connecting said first passageway to said second passageway,

said adjustable valve means positioning an adjustable restrictive orifice through which fluid must pass in order to flow between said first and second chambers,

said housing includes a tubular body member enclosing said cylindrical bore and first and second head members respectively mounted to said body member over opposite ends of said bore,

said first and second passageways extending through said first head member and opening onto one surface of of said first head member in mutual proximity,

a recess in said one surface of said first head member into which said first and second passageways open,

said adjustable valve means including a valve body member mounted to said first head member over said recess and a valve element,

said valve body member having a hole extending therethrough in alignment with the opening of said first passageway into said recess, and

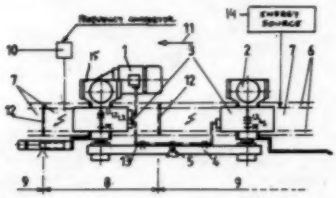
said valve element being axially movable in said hole toward and away from said opening to provide an adjustable restriction to the flow of said hydraulic fluid between said first and second passageways.

**4,941,555**

## ELECTRIC MONORAIL CONVEYOR

**Eloy da Silva Antunes, Dillingen, Fed. Rep. of Germany, assignor to Seiwert Stahl- und Apparatebau GmbH, Dillingen, Fed. Rep. of Germany**

**Filed Jul. 22, 1988, Ser. No. 223,546**
**Claims priority, application Fed. Rep. of Germany, Jul. 25, 1987, 3724763**
**Int. Cl.[5] B60L *15/00*; B60M *1/00***
**U.S. Cl. 191—14** **3 Claims**



1. A conveyor comprising elongated guide means; at least one vehicle suspended on and movable along said guide means; and drive means for said vehicle comprising a third rail adjacent said guide means and including alternating first and second sections and insulating means provided between said first and second sections and including means for galvanically separating said first sections from said second sections, electric motor means provided on said vehicle and arranged to advance the vehicle along said guide means, said motor means being electrically connected with said third rail, a follower tracking said third rail, the distance of the locus of tracking of the third rail by said follower from the electrical connection between said motor and said third rail being greater than the length of one of said second sections, means for electrically connecting said follower with said motor means, means for supplying higher-frequency current to the first sections of said third rail, and means for supplying lower-frequency current to the second sections of said third rail including means for gradually reducing the frequency of lower-frequency current when said motor means advances from one of said first sections to the adjacent second sections of said third rail.

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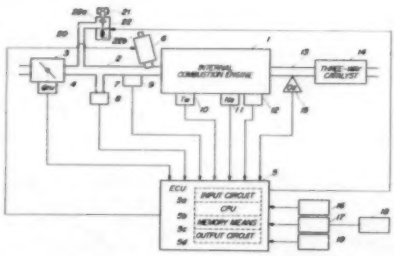
**4,941,556**

## ELECTRONICALLY-CONTROLLED FUEL INJECTION SYSTEM FOR INTERNAL COMBUSTION ENGINES

**Eltetsu Akiyama, Wako, Japan, assignor to Honda Giken Kogyo K.K., Tokyo, Japan**

**Filed Oct. 3, 1989, Ser. No. 416,517**
**Claims priority, application Japan, Oct. 12, 1988, 63-256472**
**Int. Cl.[5] F16D *43/00*; B60K *20/00***
**U.S. Cl. 192—0.062** **5 Claims**



1. In an electronically-controlled fuel injection system for an

internal combustion engine, said system having acceleration determining means for determining whether or not said engine is in an accelerating condition, and accelerating fuel increasing means for increasing an amount of fuel supplied to said engine by means of an incremental value when said acceleration determining means determines that said engine is in said accelerating condition,

the improvement comprising:

rotational speed detecting means for detecting whether or not the rotational speed of said engine exceeds a predetermined value while said acceleration determining means determines that said engine is in said accelerating condition;

time period discriminating means for discriminating whether or not a predetermined time period has elapsed from the time said rotational speed detecting means detected that the rotational speed of said engine increased above said predetermined value; and

incremental value limiting means for limiting said incremental value to a predetermined upper limit value if the former exceeds the latter before said time period discriminating means discriminates that said predetermined time period has elapsed.

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**4,941,557**

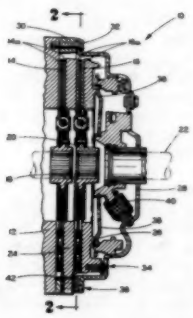
## INTERMEDIATE PLATE POSITIONER MEANS FOR A FRICTION CLUTCH ASSEMBLY

**Richard A. Flotow, Butler, and Thomas G. Dickson, Fort Wayne, both of Ind., assignors to Dana Corporation, Toledo, Ohio**

**Continuation-in-part of Ser. No. 822,925, Jan. 24, 1986, abandoned, which is a continuation-in-part of Ser. No. 647,621, Sep. 5, 1984, abandoned. This application Apr. 19, 1988, Ser. No. 186,651**

**Int. Cl.[5] F16D *13/75***

**U.S. Cl. 192—70.25** **6 Claims**



1. A friction clutch for selectively connecting an input shaft to an output shaft for rotation therewith comprising:

a flywheel attached to the input shaft for rotation therewith;

a cover attached to said flywheel for rotation therewith;

a pressure plate disposed between said flywheel and said cover, said pressure plate being connected to said cover for rotation therewith and being axially movable relative thereto between engaged and released positions;

an intermediate plate disposed between said flywheel and said pressure plate;

means for connecting said intermediate plate to said cover for rotation therewith, said connecting means permitting axial movement of said intermediate plate between engaged and released positions and exerting a relatively small force urging said intermediate plate toward said cover;

first and second axially movable clutch disks connected to the output shaft for rotation therewith, said first clutch disk being disposed between said flywheel and said intermediate plate and said second clutch disk being disposed between said intermediate plate and said pressure plate, said clutch disks including friction facing material having an initial thickness which is decreased as wear occurs thereto;

means for selectively exerting a relatively large force against said pressure plate to axially move said pressure plate toward said engaged position such that said clutch disks are frictionally engaged between said pressure plate, said intermediate plate, and said flywheel to connect the input shaft to the output shaft for rotation therewith; and

a positioner pin extending through an aperture formed in said intermediate plate having a first end adjacent said flywheel and a second end adjacent said cover, said positioner pin being maintained in said aperture in an interference fit with said intermediate plate and having a frictional resistance to movement through said aperture which is greater than said relatively small force and less than said relatively large force, said first end of said positioner pin abutting said flywheel when said clutch is engaged and said second end of said positioner pin abutting said cover when said clutch is disengaged, said positioner pin being shaped in the form of a hollow cylinder having a longitudinal slot formed therethrough defining longitudinally extending side portions, an inwardly extending flange being formed along each of said side portions, said flange portions being spaced apart from one another when said positioner pin is disposed within said aperture.

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**4,941,558**

## CLUTCH DISC

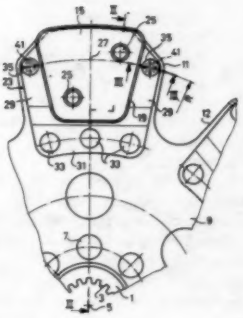
**Alfred Schraut, Waigolshausen, Fed. Rep. of Germany, assignor to Fichtel & Sachs AG, Schweinfurt, Fed. Rep. of Germany**

**Filed Oct. 7, 1988, Ser. No. 255,548**

**Claims priority, application Fed. Rep. of Germany, Oct. 14, 1987, 8713810[U]**

**Int. Cl.[5] F16D *13/60***

**U.S. Cl. 192—107 C** **2 Claims**



1. A clutch disc for a motor vehicle friction clutch, comprising:

a hub (1) with a lining carrier disc (9) held thereon, which lining carrier disc (9) includes in the region of its outer circumference several star-shaped radially projecting lining carrier segments (11) offset against each other in a circumferential direction, the carrier segments being separated from each other by recesses (12) which are arranged to open towards the outer circumference of the carrier disc (9);

friction pad plates (13), (15) arranged in pairs axially on both sides of each lining carrier segment (11), said pairs of friction pad plates including first friction pad plate (13)

fastened at the lining carrier segment (11), and a second friction pad plate (15);

radially curved spring segments (23), each second friction pad plate (15) being fastened at one of the spring segments (23);

first fastening elements (35) arranged so as to guide each spring segment in a circumferential direction on both sides of the second friction pad plate (15) so that the spring segment is radially movable with axial clearance at the lining carrier segment (11); and

second fastening elements (33) arranged so as to retain the spring segments radially toward the hub (1) at the lining carrier disc (9), the lining carrier segments (11) being relatively non-resilient with respect to the spring segments (23), and the spring segments (23) being arranged so as to project beyond the second friction pad plates (15) in a circumferential direction on both sides of the second friction pad plates (15), as well as radially towards the hub with edge strips (29), (31) which are continuously flat between the first and second fastening elements and which essentially follow an edge contour of the second friction pad plates (15).

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**4,941,559**

## WET FRICTION MEMBER, AND WET FRICTIONAL ENGAGEMENT APPARATUS FOR A TRANSMISSION USING THE SAME

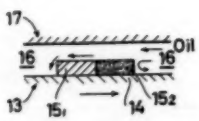
**Keiichi Ishikawa; Tadashi Tsuchiyama, both of c/o Kabushiki Kaisha Honda Gijutsu Kenkyusho, No. 4-1, 1-chome, Chuo, Wako-shi, Saitama-ken; Yasuyuki Suzuki, and Hiroaki Hasegawa, both of c/o Kabushiki Kaisha FCC Kenkyusho, of No. 7000-46, Tekunorando, Hosoe-cho, Inasa-gun, Shizuoka-ken, all of Japan**

**Filed Jun. 9, 1989, Ser. No. 363,731**

**Claims priority, application Japan, Jun. 13, 1988, 63-143485**

**Int. Cl.[5] F16D *13/6, 13/74***

**U.S. Cl. 192—107 R** **4 Claims**




3. A wet frictional engagement apparatus comprising:

an input side member,

an output side member,

a wet friction member attached to one of said input side member and said output side member,

an opposite member facing said friction member and attached to the other of said input side member and said output side member, and

means for applying pressure to engage said friction member and said opposite member; said wet friction member comprising:

a substrate,

a plurality of first friction submembers mounted spaced apart on said substrate,

a plurality of second friction submembers mounted on said substrate, each adjacent one of said first friction submembers forming a pair of submembers, each pair of submembers being spaced from each adjacent pair by an oil groove, each said first friction member being relatively less oil-permeable and each second friction member being relatively more oil-permeable, whereby said wet friction member has a different effective coefficient of friction depending on which direction relative motion between said friction member and said opposite member occurs when pressure is applied by said means.

**4,941,560**

## SECURITY DEVICE FOR TROLLEYS

**Raymond J. Bailey, Caboolture, Australia, assignor to GDT PTY. Ltd., Queensland, Australia**

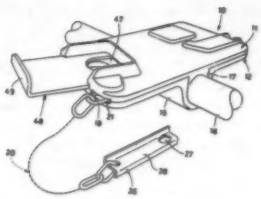
**PCT No. PCT/AU87/00240, § 371 Date Feb. 3, 1989, § 102(e) Date Feb. 3, 1989, PCT Pub. No. WO88/01084, PCT Pub. Date Feb. 11, 1988**

**PCT Filed Apr. 6, 1988, Ser. No. 328,127**

**Claims priority, application Australia, Aug. 6, 1986, PH7304**

**Int. Cl.[5] G07F *17/00***

**U.S. Cl. 194—250** **15 Claims**



1. A security device for releasably connecting an article to at least one other article in a queue, row or stack of the articles, the device including:

a body mountable on the article and having two ends;

a flexible member attached to one said end of the body and having a key means at a free end of said flexible member;

a longitudinal cavity in the other said end of the body to releasably receive the key means of a similar device on a second article in the queue, row or stack;

a locking arm movably mounted in the cavity to releasably engage the key means of the device on the second article;

a tongue in the body operable to move the locking arm from an engaged position with the key means of the device on the second article to a released position where the key means is no longer engaged by the locking arm; and

an operating member movably mounted in the body and arranged to receive a suitable coin and so arranged that the operating member will move the tongue only when the coin is received in the operating member;

wherein the locking arm has (a) a first cam face engageable by the tongue to move the locking arm to the released position to enable the key means to be withdrawn from the body, (b) a second cam face engageable by the key means as the key means is inserted into the body to move the locking arm to the engaged position where the locking arm engages the key means and (c) and engaging means for releasably engaging the tongue when the key means is released such that retrieval of the coin from the operating member is prevented.

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**4,941,561**

## ARTICLE SORTING DEVICE

**Keiji Yamabe, and Masao Yoshinaga, both of Tokyo, Japan, assignors to Nihon Cement Co., Ltd., Tokyo, Japan**

**Filed Aug. 28, 1989, Ser. No. 399,325**

**Claims priority, application Japan, Feb. 27, 1987, 62-28932**

**Int. Cl.[5] B65G *47/46***

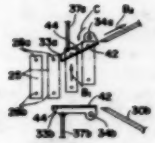
**U.S. Cl. 198—365** **2 Claims**

1. In an article sorting device equipped with a pair of spaced, substantially parallel endless chains which are connected to drive means so as to drive said chains to rotate in a common direction;

a plurality of article conveying boards that are mounted on said endless chains and slidable in a direction perpendicular to the driven direction of said pair of endless chains, sorting pins attached to a bottom surface thereof for movement along sorting pin moving paths; and

a pair of sorting members that enter the moving paths of said sorting pins, each sorting member having an end part, and guide the sorting pins in prescribed directions;

the article sorting device characterized in that a downward slanted part is provided at each end part of said sorting



members that enters the moving path of said sorting pin, the slanted parts having upper edges formed in a wedge shape, said sorting pins having lower end parts that correspond to the slanted parts of said sorting members, said lower end parts being formed in a conical form.

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**4,941,562**

## ARRANGEMENT FOR TRANSPORTING ARTICLES, IN PARTICULAR PACKAGES OF RECTANGULAR BOX-SHAPE

**Wilhelm Proepper; Harald Juenkersfeld, both of Wuppertal, and Georg Fischer, Velbert, all of Fed. Rep. of Germany, assignors to Benz & Hilgers GmbH, Duesseldorf, Fed. Rep. of Germany**

**Filed May 5, 1988, Ser. No. 190,737**

**Claims priority, application Fed. Rep. of Germany, May 9, 1987, 3715570**

**Int. Cl.[5] B65G *47/24***

**U.S. Cl. 198—416** **12 Claims**

1. An improved arrangement for turning each of a series rectangular box-shaped articles during their transportation in a feed direction along a substantially horizontal feed path means which is laterally limited by curved guide means, including endless, drivable push means coacting with each one of said series of rectangular box-shaped articles, said push means include sliders which first engage excentrically each box-shaped article for turning it and then engage it centrally or symmetrically, the improvement comprising in combination,

said feed path means includes a plurality of contiguous paths, each one of which has an outlet end,

said contiguous paths converge toward each other near their outlet ends,

said sliders include first and second slide means,

said first slide means consist of a plurality of elements which are mounted in a row and spaced at a predetermined distance adjacent to each other, said distance is selected in such a way as to permit the passage of a rectangular box-shaped article between adjacent elements,

said second slider means consist of a single transverse slider which extends transversely across all contiguous paths,

said curved guide means is constructed in such a way that during a forward slide movement of said rectangular box-shaped articles along said contiguous paths said rectangular box-shaped articles are moved laterally, whereby the first slide means engage said rectangular box-shaped articles excentrically so that said articles are slidably turned into an intermediate position by engagement with said curved guide means and thereafter they are engaged by said single transverse slider and said articles are further turned and moved in said feed direction towards the outlet ends of said contiguous paths.

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**4,941,563**

## CONVEYING DEVICE

**Otmar Fahrion, Dürerstr. 9, D-7014 Kornwestheim, Fed. Rep. of Germany**

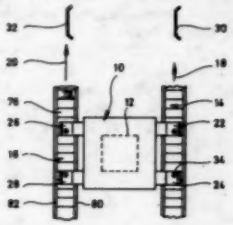
**PCT No. PCT/EP87/00551, § 371 Date Jan. 25, 1989, § 102(e) Date Jan. 25, 1989, PCT Pub. No. WO88/02345, PCT Pub. Date Apr. 7, 1988**

**PCT Filed Sep. 28, 1987, Ser. No. 327,920**

**Claims priority, application Fed. Rep. of Germany, Oct. 3, 1986, 3633702**

**Int. Cl.[5] B65G *37/00***

**U.S. Cl. 198—465.3** **24 Claims**



1. Conveying device with at least two endless conveyors (14, 16) extending parallel to each other, which form a substantially closed conveying surface and with pallets (10), which rest by way of contact members (22 to 28) on the endless conveyors (14, 16), at least two of the endless conveyors (14, 16) travelling at different speeds and the frictional connection between the pallets (10) and the groups of endless conveyors (14, 16) travelling at different speeds being able to be controlled depending on the displacement, characterized in that the control of the frictional connection between the pallets (10) and the endless conveyors (14, 16) takes place by controlling the frictional connection between the contact members (22 to 28) of the pallets (10) and the conveying surfaces (78) of the endless conveyors (14, 16), this control taking place jointly for all the contact members (22 to 28) co-operating with one of the endless conveyors (14, 16) and in phase opposition for the various sets of contact members (22 to 28) associated respectively with one of the endless conveyors (14, 16).

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**4,941,564**

## METHOD OF AND APPARATUS FOR TRANSFERRING MOTORCYCLE

**Hiroyuki Noguchi; Makoto Makino, and David M. Nye, all of Marysville, Ohio, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Apr. 6, 1989, Ser. No. 333,908**

**Int. Cl.[5] B65G *37/00***

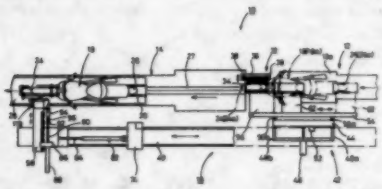
**U.S. Cl. 198—468.2** **25 Claims**

5. An apparatus for transferring a motorcycle being assembled from a first conveyor line to a second conveyor line, comprising:

a wheel gripping means for gripping a first wheel of the motorcycle, said wheel gripping means being reciprocally movable between the first and second conveyor lines; and

a wheel transfer base means for placing the second wheel of

the motorcycle, said wheel transfer base means being reciprocally movable between the first conveyor line and



a prescribed position on the second conveyor line in synchronism with said wheel gripping means.

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**4,941,565**

**DISPERSION FEEDER**

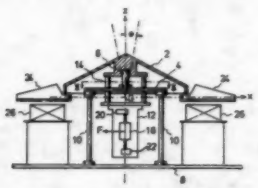
**Ryuichi Hirota, Miki; Masatomi Tsuruoka, Hyogo, and Shinichi Inoue, Kobe, all of Japan, assignors to Yamato Scale Company, Limited, Akashi, Japan**

**Continuation of Ser. No. 907,020, Sep. 15, 1986, abandoned. This application Apr. 18, 1988, Ser. No. 182,924**

**Claims priority, application Japan, Dec. 17, 1985, 60-194952[U]**

**Int. Cl.[5] B65G *47/72***

**U.S. Cl. 198—601** **8 Claims**



1. A dispersion feeder for use in a combination weighing machine of the type having a plurality of weighing units circularly arranged around said dispersion feeder and a plurality of linear vibration feeders radially arranged between said dispersion feeder and respective weighing units for transferring product from said dispersion feeder to said weighing units; said dispersion feeder comprising a dispersion table generally symmetric about a vertical axis for dispersedly transferring product fed onto said table toward the periphery thereof, a first movable support base disposed under said table, a central elastic column having an upper end affixed to said dispersion table and a lower end affixed to said first support base for movably supporting said table above said first support base, a second suport base disposed under said first suport base, a plurality of elastic columns having upper ends affixed to said first support base and lower ends affixed to said second suport base for movably supporting said first support base above said second support base, and means affixed to said dispersion table for applying a force thereto to impart to said dispersion table a precessional movement about said vertical axis and to induce orbital movement of said first support base about said vertical axis.

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**4,941,566**

**SPIRAL CONVEYOR WITH TEXTURED CAPSTAN**

**Guy L. Irwin, 512 Oreland Mill Rd., Oreland, Pa. 19075**

**Filed Feb. 21, 1989, Ser. No. 312,810**

**Int. Cl.[5] B65G *21/18***

**U.S. Cl. 198—778** **10 Claims**

1. A spiral conveyor, comprising:

a conveyor belt;

said conveyor belt being of a type that is capable of telescoping at one edge to conform to a spiral shape;

a capstan;

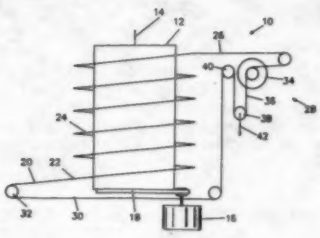
said capstan being generally cylindrical with a vertical central axis;

means for rotating said capstan about said vertical central axis;

a peripheral surface on said capstan;

at least a portion of said conveyor belt being conformed in said spiral shape with an inner edge thereof contacting said peripheral surface;

means for applying a longitudinal tension to said conveyor



belt at least in a vicinity of a departure of said conveyor belt from said spiral shape;

said inner edge including a plurality of protuberances;

a plurality of grooves in said peripheral surface; and

said plurality of grooves being shaped and disposed to interact with said plurality of protuberances to modify a cumulative friction between said inner edge and said peripheral surface;

said capstan includes a plurality of parallel vertical bars;

outer surfaces of said vertical bars forming said peripheral surface; and

said plurality of grooves being disposed in said outer surfaces.

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**4,941,567**

**CONVEYOR BELT**

**Lennart Olsson, Nyhamnslage, Sweden, assignor to Frigoscandia Contracting AB, Helsingborg, Sweden**

**PCT No. PCT/SE86/00582, § 371 Date Jun. 21, 1988, § 102(e) Date Jun. 21, 1988, PCT Pub. No. WO87/04136, PCT Pub. Date Jul. 16, 1987**

**PCT Filed Dec. 22, 1986, Ser. No. 209,683**

**Claims priority, application Sweden, Dec. 27, 1985, 8506136**

**Int. Cl.[5] B65G *21/18***

**U.S. Cl. 198—778** **4 Claims**

1. A conveyor belt which is adapted in endless design to follow, through a part of its length, a path comprising a number of superimposed, helically extending tiers forming a belt pile, said belt conveyor consisting of mutually articulated and relatively adjustable link means, each comprising a bottom part (2) and spacer means (3) arranged at the longitudinal edges of said bottom part and forming the two sides of the belt, said spacer means being adapted, with their upper edge portions

(4), to bear against the lower edge portions of the overlying tier of the conveyor belt and being fixedly connected, through a part (6) of their length, to the longitudinal edges of said bottom part, and and through the remaining part (7), being movably relative to said bottom part, characterized in that each spacer means (3) on the outer side of the belt pile is provided with shoulders (8, 9) mutually displaced in the lateral direction of the belt (1) and, for engaging both the inner and the outer side of an upper edge portion (4) of the corresponding spacer means of the underlying belt tier, and thus for positively guiding this edge portion in both lateral directions between said oppositely directed shoulders, and that each spacer means (3) on the inner side of the belt tier has at least those shoulders (8) which are intended to engage the inner side of an upper edge portion (4) of the corresponding spacer means of the underlying belt tier, and characterised in that the shoulder of the spacer means (3), which shoulder is intended to engage the inner side of said upper edge portion (4), is formed by a flange (8) which is directed obliquely downwardly and inwardly from the spacer means part (7) which is movable relative to said bottom part (2), and that the shoulder of said spacer means (3), which shoulder is intended to engage the outer side of said upper edge portion (4), is formed by a lower portion (9) of the spacer means part (6) which is fixed relative to said bottom part (2), said portion (9) being angled obliquely downwardly and outwardly.

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**4,941,568**

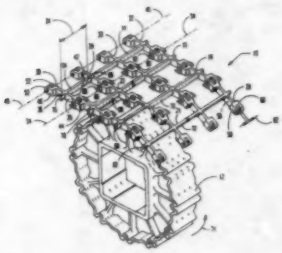
## ACCURATE TRACKING CENTER DRIVEN OPEN AREA BELT

**James M. Lapeyre, New Orleans, La., assignor to The Laitram Corporation, Harahan, La.**

**Continuation of Ser. No. 105,011, Oct. 6, 1987, abandoned. This application Dec. 4, 1989, Ser. No. 445,916**

**Int. Cl.[5] B65G *17/06***

**U.S. Cl. 198—853** **22 Claims**



1. An integrally molded plastic module having a plurality of elongated members joining first and second groups of link ends, said module suitable for forming a linked conveyor belt by pivotally connecting a multiplicity of such modules end-to-end, said module comprising:

a plurality of links spaced apart a first selected distance, selected ones of said spaced links including an elongated member extending between and joining two link ends of said first group to two link ends of said second group, each of said two link ends of said first group circumscribing a pivot hole aligned along a first pivot axis, and each of said two link ends of said second group circumscribing a pivot hole aligned along a second pivot axis parallel to said first pivot axis, said first and second pivot axes defining a common plane therebetween, said two link ends of each group spaced apart a second selected distance which is less than said first selected distance, one of said two link ends of said first group including a portion extending perpendicular to and away from said pivot axes such that intermeshing of link ends of said first group with said second group is selectively limited, and said plurality of elongated members being resistant to bending in a direction so as to maintain said common plane between said first and second pivot axis; and

a cross member integrally molded with and joining each of said plurality of spaced links to maintain each one of said plurality parallel to each other and spaced at said first selected distance, said cross member and said plurality of links defining a first side and a second side.

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**4,941,569**

## KEY CASE HAVING A SWING-OUT FLAT KEY

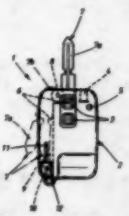
**Martin Lindmayer, Böblingen; Rudi Kneib, Sindelfingen; Günther Weikert, Weil der Stadt; Wolfgang Schneider, Calw; Rolf Krügener, and Klaus-Peter Claar, both of Sindelfingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed Nov. 14, 1989, Ser. No. 436,039**

**Claims priority, application Fed. Rep. of Germany, Dec. 20, 1988, 3842790**

**Int. Cl.[5] A45C *11/32, 15/00***

**U.S. Cl. 206—38.1** **9 Claims**



1. A key case having a swing-out flat key and a slotted passage opening for the flat key;

the key case having an opening extending continuously over a corner of the case with merging adjoining longitudinal sections at a front and side edge of the key case for entry of the flat key into the key case;

wherein the flat key has a grip part and a shank part angled approximately perpendicularly hereto;

wherein the flat key is articulated on the key case via a pivot means engaging its grip part in an area near a free end of the flat key;

wherein the pivot means is located in an area near to the front edge of the key case and at a lateral distance from the aforementioned corner of the key case and from a center longitudinal axis of the key case;

wherein the shank part of the flat key, in a swung-out working position, projects from approximately the center of the front edgeof the key case;

wherein the key case is designed as an elongated rectangular housing;

wherein the passage opening provides a boundary for a key receiving space which is a two-legged receiving shaft which, viewed over its length, is essentially L-shaped and extends with the longer leg of the L-shape along the side edge and with the shorter leg of the L-shape along the front edge of the housing;

wherein the flat key, in its non-working position is pivoted into a lowered position with its shank part entering into the longer leg of the L-shaped receiving space and with its grip part into a longitudinal area of the shorter leg of the L-shaped housing space near the corner of the key case; and

wherein the shank part of the flat key can be pivoted on the pivot means to travel outside the housing and around the aforementioned corner into a working position where the key shank part is pointed in the opposite direction from its non-working position and whereupon the grip part which is also pivoted the shank part engages into a longitudinal

area of the shorter leg more remote from the aforementioned corner than the pivot means.

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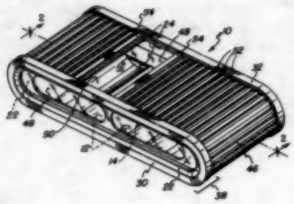
**4,941,570**

## WRENCH SOCKET DISPENSER

**Kurt J. Kruger, Milford, and John T. Loechner, Westport, both of Conn., assignors to Easco Hand Tools, Inc., Hunt Valley, Md.**

**Filed Apr. 19, 1989, Ser. No. 340,215**
**Int. Cl.[5] B65D *83/02, 43/20***
**U.S. Cl. 206—267** **6 Claims**



1. A case for storing and selectively dispensing socket members for use with a universal socket wrench comprising:

A. a substantially continuous, unitary base comprising a plurality of elongated, parallel U-shaped grooves positioned in a side-by-side relationship, each of said elongated grooves having

a. a size and shape for receiving and holding one of said socket members,

b. sidewalls defined by said U-shape for separating said grooves, with said sidewalls being sufficient in height to laterally retain the socket members stored therein,

c. first and second open zones formed at each end of each elongated groove, and

d. a third, elongated open zone extending the entire length of each elongated groove, defined by the opening of said U-shape and enabling the socket members stored therein to be laterally removed and replaced in its entirety rapidly and efficiently;

B. a belt incorporating a single aperture zone which comprises a size and shaped substantially equal to the size and shape of the third open zone of the grooves of the base; and

C. at least two end pieces, each being

a. constructed for mounting to one side edge of said base for closing the first and second open zones thereof and preventing axial, longitudinal withdrawal of said socket member from said groove, and

comprising a belt receiving slot formed therein, positioned in juxtaposed spaced, facing cooperating relationship with the slot of the opposed end piece, defining a belt receiving track enabling the movement of the belt relative to the base

whereby the aperture zone of the belt is selectively positionable into overlying, juxtaposed, spaced relationship with any one of said elongated grooves, providing rapid and efficient ingress and egress of the socket member positioned within said groove.

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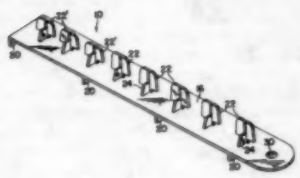
**4,941,571**

## WRENCH SOCKET HOLDER

**Charles G. Barrett, 247 Neptune Dr., Groton, Conn. 06340, and James B. Malloy, 73 Kenney Ave., West Hartford, Conn. 06107**

**Filed Jan. 25, 1989, Ser. No. 302,315**
**Int. Cl.[5] A47G *29/00*; B65B *85/20***
**U.S. Cl. 206—378** **20 Claims**

1. Wrench socket holder comprising a support base, a resilient flexible wrench socket retaining member having a pair of upwardly converging opposite edges, an attaching means for connecting said wrench socket retaining member to said support base for flexure in generally tangential directions about an upwardly extending axis of symmetry of said wrench socket



retaining member, said axis being generally normal to said support base, said flexure causing each of said opposite edges to move in an arc about said upwardly extending axis of symmetry.

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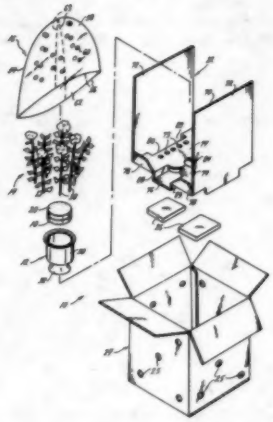
**4,941,572**

## METHOD AND PACKAGE FOR FRESH CUT FLOWER ARRANGEMENTS AND PLANTS

**Charles C. Harris, St. Louis, Mo., assignor to Jetram Sales, Inc., St. Louis, Mo.**

**Filed May 24, 1989, Ser. No. 357,062**
**Int. Cl.[5] B65D *85/50*; A01G *9/02*; B65B *55/18***
**U.S. Cl. 206—423** **22 Claims**



1. A package for horticultural articles, the package comprising:

(a) a container for a horticultural article including an upper portion and a lower portion,

(b) a water-containing absorbent material disposed in the lower portion of the container adapted to receive the horticultural article,

(c) a foamed-in-place non-absorbent foam block disposed in the upper portion of the container above the absorbent material substantially completely filling the upper portion of the container to a selected level to support the article in a generally upright position and forming a substantially impervious cap for the absorbent material,

(d) a cover of plastic film disposed about the horticultural article, and

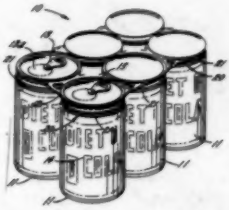
(e) a shipping container receiving the article container therewithin including means for holding the article container in a stable condition during shipping.

**4,941,573**

## PACKAGE IDENTIFICATION SYSTEM

**Leland L. Fuerstman, Charlotte, N.C., assignor to Color Ident Systems Corporation, Charlotte, N.C.**

**Filed May 26, 1988, Ser. No. 199,009**
**Int. Cl.[5] B65D 73/00**
**U.S. Cl. 206—459** **15 Claims**



1. An identification system for distinguishing among the individual containers of a consumer package of beverages comprising

a plurality of beverage containers substantially identical in size and shape to each other and containing identical contents therein;

means removably holding said containers together for packaging said containers as an integrated consumer package of beverages;

a first indicia borne on the major surface area of each container with each indicia borne on each container being identical with the indicia of each of the other containers and serving to convey information about the beverage such as the name, origin, ingredients and the like;

a smaller identifying indicia positioned on a minor surface area of each container, with the smaller identifying indicia on each container being distinctly and visibly different from the smaller, identifying indicia on each of the other containers in the consumer package so that during consumption of the beverage a user may readily distinguish his container from the other containers in the package.

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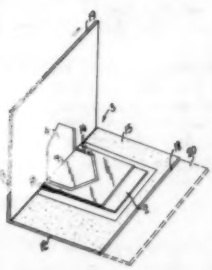
**4,941,574**

## PACKAGE FOR A LIQUID SAMPLE AND AN ASSOCIATED METHOD FOR PACKAGING A LIQUID SAMPLE

**Frank Meehan, 203 Cathedral Ave., Hempstead, N.Y. 11550**

**Filed Aug. 11, 1989, Ser. No. 392,343**
**Int. Cl.[5] B65D 75/28**
**U.S. Cl. 206—466** **28 Claims**



1. A package for a liquid sample comprising a sealed envelope containing a small quantity of liquid, said envelope including seal means which can be peeled open to provide access to said liquid, said envelope being relatively flat and thin, a flat protective enclosure for said envelope, said envelope being engaged within and enclosed in said enclosure, said enclosure having an opening through which said envelope is visible and engageable, and means releasably connecting said envelope in said enclosure such that upon engaging said envelope at said opening and applying a force to the envelope, the connecting means can be overcome and said envelope can be removed from the enclosure in intact sealed state, said enclosure being of a thickness to provide outer surfaces which extend beyond the envelope and protect the envelope.

12. A package for a liquid sample comprising a sealed envelope of film material containing a liquid sample, protective support means engaging said envelope around a portion of the perimetral extent of said envelope to leave a remaining portion of the envelope free and unsupported, said protective support means being relatively rigid compared to said envelope to hold said envelope with stability in a position in which said support means has outer surfaces between which said envelope is confined, and means for detachable separation of said envelope in intact sealed state from said support means by manually engaging said free and unsupported remaining portion of said envelope and detaching the envelope from the support means.

26. A packaging method for a liquid sample comprising:

sealing a liquid sample in an envelope of film material;

detachably supporting said envelope in a protective enclosure having greater rigidity than the envelope by engaging the envelope around a portion of the perimetral extent of the envelope to leave the envelope exposed outside the engaged portion and free and unsupported along the remaining portion of its perimetral extent,

providing the protective enclosure with a thickness such that the envelope is recessed below outer surfaces of the enclosure, and

separating the envelope in intact state from the enclosure by manually engaging and pulling the exposed portion of the envelope to overcome the detachable support of the envelope by the enclosure.

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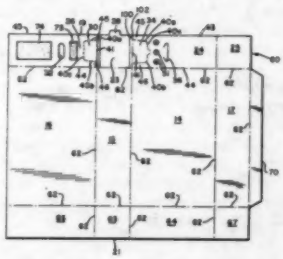
**4,941,575**

## SIFT-PROOF CARTON AND BLANK THEREFOR

**Herbert Friedman, Fort Lee, N.J., assignor to Ivy Hill Corporation, New York, N.Y.**

**Filed Apr. 27, 1989, Ser. No. 344,972**
**Int. Cl.[5] B65D 5/70**
**U.S. Cl. 206—621.3** **18 Claims**



1. In a carton comprising

(A) sides and ends defining a rectangular parallelepiped, said sides being formed by side panels and said ends by end panels, one of the carton ends comprising first, second, and third end panels which are connected to first, second and third side panels, respectively;

(i) said first and third end panels extending from said first and third side panels, respectively, a substantial distance towards said third and first side panels, respectively, in an at least partially overlying relationship,

(ii) said second end panel being pivotably connected to

said second side panel and extending partially over said first and third end panels; and

(B) means adhering said second end panel to the outer of said first and third end panels which permits said second end panel to be separated from said outer end panel and pivoted to expose the previously underlying portion of said outer end panel;

the improvement comprising

an insert having one surface thereof secured adjacent one end to said second panel and adjacent the other end to said outer end panel, thereby providing a sift-resistant carton.

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**4,941,576**

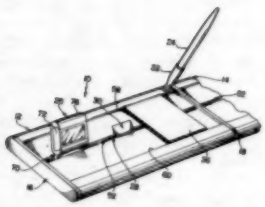
**HOLDER FOR A TAPE MARKER FLAG DISPENSER AND THE LIKE**

**Louis Sugarman, Barrington, and Max B. Dressler, Warwick, both of R.I., assignors to Alcraft, Inc., Pawtucket, R.I.**

**Filed Apr. 13, 1989, Ser. No. 338,230**

**Int. Cl.[5] A47F *7/00***

**U.S. Cl. 211—13** **12 Claims**



1. A holder for a dispenser for tape marker flags and the like wherein the dispenser includes a housing having an enlarged body portion and an upwardly extending open ended tubular neck portion of elongated cross sectional length and reduced cross sectional width on said body portion and a supply of tape marker flags in said body portion which are individually dispensable from said housing through said neck portion, said holder comprising a channel member having an upper surface and having a channel therein, said channel member being adapted to be received and supported on a supporting surface so that said upper surface faces upwardly, said channel including an enlarged inner portion and a reduced mouth portion which opens upwardly along said upper surface, said channel being open at one end thereof, said channel being dimensioned for receiving said dispenser therein through said open end and for positioning said dispenser so that said body portion is received in said channel inner portion and said neck portion extends upwardly into said mouth portion terminating adjacent said upper surface, said mouth portion being dimensioned for positioning said neck portion in substantially aligned relation therein and for preventing removal of said dispenser from said channel member therethrough.

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**4,941,577**

**PORTABLE ROBOTIC TOOL RACK**

**Herbert E. Ferree, Greensburg; Harry N. Andrews, Export; Frank W. Cooper, Jr., and Joseph R. Herberg, both of Monroeville Borough, all of Pa., assignors to Space Industries Partnership, L.P., Webster, Tex.**

**Filed Jul. 21, 1988, Ser. No. 222,584**

**Int. Cl.[5] A47F *7/00***

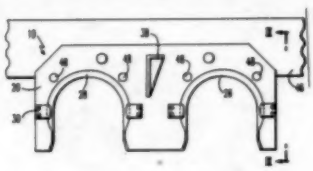
**U.S. Cl. 211—70.6** **5 Claims**

1. A rack for holding a plurality of tools, each of said tools having means thereon for releasably engaging a tool using device, said rack comprising:

a plate member having a plurality of openings therein, each of said openings being dimensioned to receive one of said tools;

means for releasably securing said plate member to a surface;

self-engaging means associated with each of said openings for releasably securing said tool; and



means associated with each of said openings for interacting with said tool using device to permit engagement and disengagement of said tool to said tool using device.

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**4,941,578**

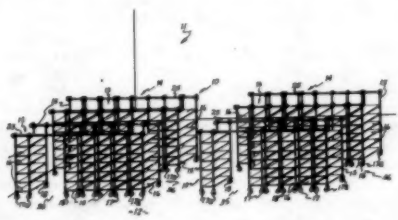
**HIGH DENSITY STORAGE SYSTEM**

**Charles K. Devening, 11431 Village Brooke Ct., Cincinnati, Ohio 45249**

**Filed Aug. 5, 1988, Ser. No. 229,301**

**Int. Cl.[5] A47F *43/00***

**U.S. Cl. 211—186** **8 Claims**



1. A system of shelving racks, said system comprising a pair of end racks and multiple inner racks supported between said end racks,

each of said racks having four vertical corner posts and horizontal shelves supported from said posts, each of said racks including said end racks having wheels mounted on the lower ends of said posts, said wheels being adapted to be rotated about horizontal axes and movable over a horizontal support surface,

guide means mounted on the tops of each of the corner posts of said racks,

a pair of upper straight, parallel guide rails supported solely from said guide means,

means for securing the guide means of said end racks to said guide rails, and

means for releasably locking at least two wheels of each of said end racks against rotation so as to selectively prevent movement of said end racks over said horizontal support surface.

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**4,941,579**

**AUXILIARY DEVICE FOR A NURSING BOTTLE**

**Hwang-Sheng Lee, 84, Fl., 6-3, Sec. 3, San-Min Rd., Taichung, Taiwan**

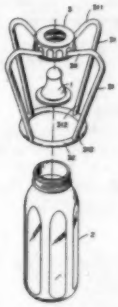
**Filed Apr. 11, 1989, Ser. No. 336,420**

**Int. Cl.[5] A61J *9/00, 9/06;* A47G *23/02***

**U.S. Cl. 215—11.1** **4 Claims**

1. An auxiliary device for a nursing bottle, said nursing bottle including a container for liquid with a mouth provided

at an upper end of said container, a nipple, and an annular anchoring member for threaded engagement with said container so as to secure said nipple onto said upper end of said container, said auxiliary device including a plurality of plastic strips extending from an outer surface of an upper portion of said bottle to an outer surface of a lower portion of said bottle so that any one of said strips can be grasped by a hand of a baby, each of said strips has a generally horizontal portion



extending radially and outwardly from said upper portion of said bottle, and an inclined generally straight portion extending from an outer end of said horizontal portion inwardly to the lower portion of said bottle and the strips being sufficient in number so that at least two of said strips are always engageable with a horizontal surface for supporting the nipple and mouth of the container in an upwardly tilted disposition to prevent leakage of liquid from the container.

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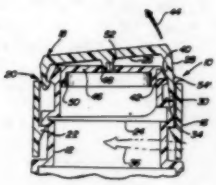
**4,941,580**

## DISPENSING CLOSURE

**Randall K. Julian, Evansville, Ind., assignor to Sunbeam Plastics Corporation, Evansville, Ind.**

**Filed May 26, 1989, Ser. No. 357,092**
**Int. Cl.[5] B65D *41/32***
**U.S. Cl. 215—235** **36 Claims**



1. A dispensing closure for attachment to a container for dispensing a product through an opening in the container comprising:

a base ring having means for attachment to said container permitting rotation without axial movement relative to said container;

a lid;

a hinge connecting said lid to said base ring allowing the lid to be swung between a closed position blocking access to said container opening and an open dispensing position; and

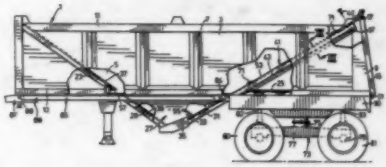
a cam element on said lid arranged so that when the base ring is rotated, the lid will be moved from its closed position toward its open position so that the lid can be swung to its open dispensing position.

**4,941,581**

## CONVERTIBLE CONTAINER AND VEHICLE

**Charles W. Searles; Robert A. Searles, and William S. Searles, all of Ontario, Canada, assignors to Searles Trailer and Equipment Ltd., Ontario, Canada**

**Filed May 29, 1987, Ser. No. 55,272**
**Int. Cl.[5] B65D *88/00***
**U.S. Cl. 220—1.5** **26 Claims**



1. A convertible cargo container, comprising: sidewalls; a rear door movably mounted between the sidewalls; a front end wall extending between the sidewalls and sloping downwardly in the direction of the rear door; a floor extending between the sidewalls and forwardly from the rear door; a hopper means mounted between the floor and the front end wall; a support means on the sidewalls for supporting a sheet above the floor; and a movably mounted sheet having first and second positions, in the first position the sheet lying between the sidewalls, covering the hopper means, and in the second position the sheet being supported on the support means between the sidewalls, sloping downwardly in the direction of the front end wall, and between the hopper means and the rear door.

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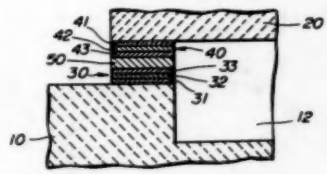
**4,941,582**

## HERMETICALLY SEALED CERAMIC PACKAGE

**Asao Morikawa, and Kazuo Kondo, both of Aichi, Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan**

**Filed Oct. 2, 1989, Ser. No. 415,777**
**Claims priority, application Japan, Oct. 7, 1988, 63-132232[U]**
**Int. Cl.[5] B65D *6/32***
**U.S. Cl. 220—2.1 R** **10 Claims**




1. A hermetically sealed ceramic package for an electric or electronic device, comprising:

a base member to support said device, the base member being formed of a low temperature fired ceramic;

a cap member formed of a ceramic; and

a hermetically sealing joint provided between an upper surface of the base member and a lower surface of the cap member, the sealing joint comprising a copper-metallized layer formed on said upper surface of the base member, a first intermediate layer which is laid on said copper-metallized layer and is formed of a metal not alloyable with copper or gold, a first gold layer laid on said first intermediate layer, a copper-metallized layer formed on said lower surface of the cap member, a second intermediate layer which is laid on the copper-metallized layer on the said lower surface and is formed of a metal not alloyable with copper or gold, a second gold layer laid on said

second intermediate layer and a joint layer which is tightly interposed between said first and second gold layers and is formed of a gold-tin eutectic alloy.

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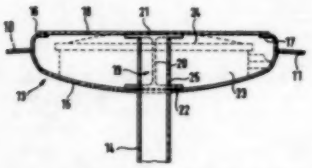
**4,941,583**
**PRESSURE TANK**

**Helmut Gerhard, Weitefeld, Fed. Rep. of Germany, assignor to Westerwaelder Eisenwerk Gerhard GmbH, Fed. Rep. of Germany**

**Filed Jan. 2, 1990, Ser. No. 459,960**
**Claims priority, application Fed. Rep. of Germany, Feb. 1, 1989, 8901105[U]**
**Int. Cl.[5] B65D *88/06***
**U.S. Cl. 220—5 A** **10 Claims**



1. A pressure-resistant tank having a casing composed of part-cylindrical casing portions with parallel longitudinal axes fitted between hollow longitudinal members, opposite longitudinal members being interconnected by tie rods which extend vertically through the tank interior,

wherein the tank casing is formed by only two casing portions fitted between top and bottom longitudinal members, said top longitudinal member being composed of a top shell which is curved transverse to the longitudinal direction and projects into the tank interior, and of a tension plate interconnecting the upper ends of the top shell.

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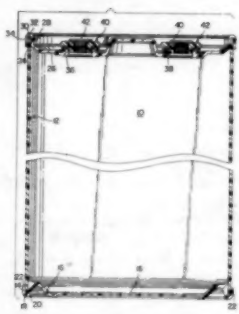
**4,941,584**
**REUSABLE PLASTIC DRUM CONTAINER ASSEMBLY**

**Robert B. Bowers, Park Ridge, and Mark Chookazian, Paramus, both of N.J., assignors to Ashland Oil Inc., Russell, Ky.**

**Division of Ser. No. 128,030, Dec. 3, 1987, Pat. No. 4,880,580.**
**This application Jun. 21, 1989, Ser. No. 369,778**
**Int. Cl.[5] B65D *7/00***
**U.S. Cl. 220—5 R** **8 Claims**



1. A reusable plastic drum container assembly, which comprises:

a plastic drum shell;

a plastic bottom closure mounted to an end of said plastic drum shell;

a plastic top closure mounted to another end of said plastic drum shell, said top closure being formed with a neck member comprised of a cylindrically-shaped portion including a cylindrically-shaped orifice extending upwardly from said top closure and formed with an indentation about a surface portion thereof; and

a fitting-receiving member including a fitting orifice mounted to said neck member, said fitting-receiving member formed with a circularly-shaped channel for receiving said neck member of said top closure, said fitting-receiving member being affixed to said neck member by thermoplastic electromagnetic material melted and conformed within an area defined by surfaces of said neck member and interior surfaces defining said channel of said fitting-receiving member.

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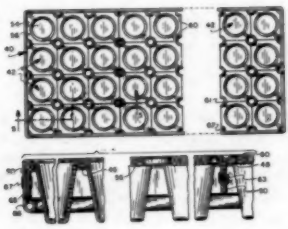
**4,941,585**
**BAKING PAN**

**Wilbert K. Hare, Lemont; Morris Kaufman, Morton Grove, and William M. Moroziuk, River Grove, all of Ill., assignors to Ekco/Glaco Inc., Humbolt, Tenn.**

**Filed May 12, 1988, Ser. No. 192,907**
**Int. Cl.[5] A47J *43/18***
**U.S. Cl. 220—23.2** **6 Claims**



1. A baking pan assembly comprising a flat panel member formed to provide a downwardly extending flange at the periphery thereof, a plurality of relatively large apertures therethrough and a plurality of relatively small apertures therethrough, said small apertures positioned equi-distant from adjacent large apertures, a plurality of baking units, each baking unit formed to provide a central cup-like portion terminating at the open end thereof in an outwardly extending rectangular-shaped flange, each said baking unit having said central cup-like portion disposed within a large aperture and said rectangular-shaped flange overlying the flat panel member to dispose each corner portion of each flange adjacent a small aperture of said flat member, each corner of the baking unit flange is notched and the panel member is formed to provide an upstanding collar adjacent each small aperture swedged to entrap the adjacent flange corners of said baking units between said collar and said panel member.

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**4,941,586**
**CONTAINER**

**Tauno Tarna, Tampere, Finland, assignor to Sarvis Oy, Tampere, Finland**

**Filed Jan. 18, 1989, Ser. No. 298,091**
**Int. Cl.[5] B65D *8/02***
**U.S. Cl. 220—83** **12 Claims**

1. A container of an upwardly open type, such as a bucket, comprising:

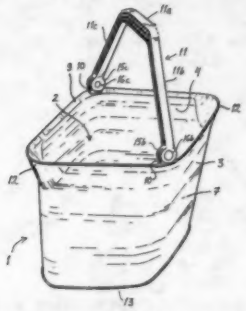
a receptacle portion and a handle for carrying the receptacle portion in a suspended position;

a receptacle of a predetermined depth provided in the receptacle portion for receiving material therein, the receptacle being defined by an inner side wall terminating in an upward direction in a brim, and an inner bottom surface, the receptacle being contained within the receptacle portion defined by an outer side surface and an outer bottom

surface, the surfaces constituting the main outer space-requiring dimensions of the container;

the outer side surface terminating in an upward direction in the brim and forming a cross-section area of substantially similar configuration along the most part of the direction of depth of the receptacle in a plane perpendicular to the direction of depth of said receptacle;

wherein the cross-section area is of an oblong configuration



for allowing the container to be positioned in an ergonomically favorable position for carrying and handling, the direction of oblongness extending substantially parallel with the direction of operation of the container; and

wherein the brim and the area of the outer side surface which is immediately below it project outwardly towards the direction of oblongness at the region of one extremity of the oblong cross-section to form a spout in order to facilitate pouring of the material out of the receptacle.

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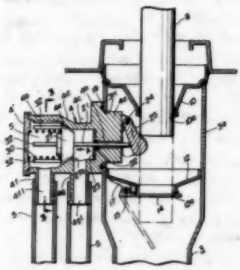
**4,941,587**

## FUEL TANK SYSTEM

**Yoshinobu Terada, Tochigi, Japan, assignor to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 1, 1989, Ser. No. 359,898**
**Claims priority, application Japan, Jun. 6, 1988, 63-74857**
**Int. Cl.[5] B65D *6/12, 6/40***
**U.S. Cl. 220—85 VS** **11 Claims**



1. a fuel tank system comprising:

a fuel tank;

a fuel filler pipe connected to said fuel tank for insertion of a refueling nozzle to refuel said tank;

a guide member disposed in said fuel filler pipe, said guide member having a central hole of a diameter for insertion of said refueling nozzle;

a shutter assembly disposed in said fuel filler pipe spaced from said guide member, said shutter assembly having a central hole of a diameter for insertion of said refueling nozzle and a shutter operable by a refueling nozzle inserted into the fuel filler pipe through said guide member central hole and said shutter assembly central hole;

an engagement member disposed in said fuel filler pipe and angularly movable through a constant angle by being engaged by the refueling nozzle inserted in said fuel filler pipe and extending from said guide member to said shutter assembly; and

a fuel venting mechanism including an on-off valve responsive to the angular movement of said engagement member for providing fluid communication between said fuel tank and an associated mechanism.

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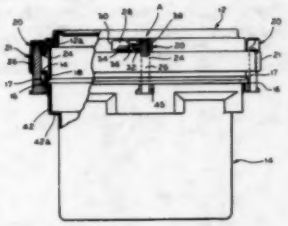
**4,941,588**

## OVERPACK DRUM

**Frank S. Flider, Mattoon, Ill., assignor to Justrite Manufacturing Company, Des Plaines, Ill.**

**Filed Aug. 28, 1989, Ser. No. 398,960**
**Int. Cl.[5] B65D *85/00***
**U.S. Cl. 220—302** **7 Claims**



1. A salvage drum for containing hazardous materials comprising:

a lid having side walls with a circular bottom;

a container having a side wall that is circular in cross section, said side wall having a sealing means extending therefrom that is in contact with said lid's circular bottom when said lid is placed in its covering position on top of said container's side walls;

a plurality of cam locks located around the periphery of said lid, said cam locks having a locked and open position and being associated with said lid and each having a cam surface formed to lock the lid on the container in the closed position and release the lid from the container in its open position, said cam locks each having a latch bolt associated with each of said cam surfaces, said cam surfaces force said lid into locking contact with said container lid in said locked position and releasing pressure on said container lid in said open position, whereby said cam locks act to cause sufficient release and locking of said lid to said container.

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**4,941,589**

## INNER LINING FOR CARGO CONTAINER

**Veronica Chen, No. 14, Lane 223, Chin-Shan Rd., San-Min Dist., Kaohsiung City, Taiwan**

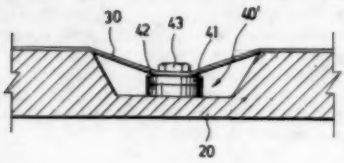
**Filed Sep. 28, 1989, Ser. No. 413,893**
**Int. Cl.[5] B65D *90/04***
**U.S. Cl. 220—403** **4 Claims**

1. A device for lining the inner surface of a cargo container comprising:

a fluid impervious flexible bag which lines the entire inner surface of the wall of the cargo container; and

magnetic pieces to hold the flexible bag against the inner surface of the wall of the cargo container, the magnetic elements being distributed on and attached to the inner surface of the wall of the cargo container at appropriate

intervals before the flexible bag contacts the wall of the cargo container;




bolts adhered to said magnetic pieces; and
nuts to clamp the flexible bag between said bolts and nuts.

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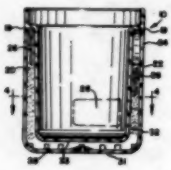
**4,941,590**
**WATER-FILLED GLASS TOY**
**Terese A. Pantaleo, 7854 Redondo La., Orland Park, Ill. 60462, and Donald E. Perrin, 255 N. 6th St., Clinton, Iowa 52732**
**Filed Jun. 16, 1989, Ser. No. 367,380**
**Int. Cl.[5] B65D *65/00***
**U.S. Cl. 220—428** **6 Claims**



1. An article of manufacture comprising:
(a) an inner surface;
(b) an outer, generally visually transparent surface;
(c) a generally annular space between and defined by said inner and outer surfaces, said annular space containing a liquid;
(d) a generally flat disk within said annular space and floating upon said liquid; and,
(e) means within said annular space for imparting turbulence to said liquid as said article is rotated about its axis.

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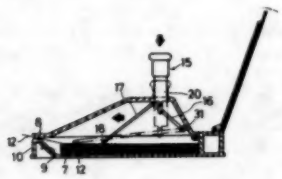
**4,941,591**
**OFFICE-TYPE STATIONERY SET**
**Shuh-Chin Lin, 5, Lane 4, Alley 35, Anlo Rd., Chung-Ho, Taipei Hsien, and Min-Ling Li, Taipei, both of Taiwan, assignors to Shuh-Chin Lin, Taiwan**
**Filed Jan. 30, 1989, Ser. No. 304,856**
**Int. Cl.[5] B65H *1/04***
**U.S. Cl. 221—100** **3 Claims**




1. An office-type stationery set, which comprises:
a basic seat to be placed on a desk; said seat having a front wall and a rear wall, the basic seat including:
at least one pen-stand set on a top of a pen-stand seat to one side of the basic seat,
a paper deposit box on one portion of the basic seat adapted to hold at least one memo sheet, said box having a lid and a slope on an inner front end permitting the at least one memo sheet to uprise along and pass through a chink between a top rim of the front wall and the lid, and,
a paper dispensing device connected with a protrusion on the lid of the paper deposit box;
an upright paper holder seat connected on the rear wall of the basic seat for removably receiving selected ones of said at least one memo sheet.

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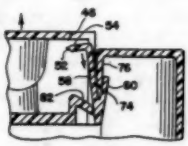
**4,941,592**
**HINGED DISPENSING CLOSURE WITH A TAMPER-EVIDENT SEAL**
**Lawrence R. Kitterman, Antioch, Ill., assignor to Seaquist Closures, Crystal Lake, Ill.**
**Filed Jun. 19, 1989, Ser. No. 367,868**
**Int. Cl.[5] B67D *5/06***
**U.S. Cl. 222—23** **7 Claims**

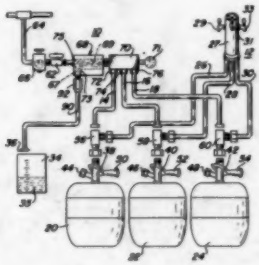



1. A plastic molded tamper-evident dispensing closure comprising a body with means for securance to a container and a lid hingedly secured to said body and movable from a closed non-dispensing position to an open dispensing position on said body, said body further defining a dispensing opening,
tamper-evident seal means integrally formed with said lid and interlocked with said body in said closed non-dispensing position,
said seal means comprising a seal segment frangibly connected to said lid and which is readily visible to a user of the closure, frangible means connecting said seal segment and said lid, and an integral depending locking section extending downwardly from said seal segment, said locking section including a locking step extending laterally from said locking section,
said body defining recess means below said seal segment and adjacent said locking step and including a first body portion, said locking step extending laterally into said recess with said first body portion overlying said locking step for engagement with said locking step to prevent movement of said lid from said closed position, and said body providing a second portion opposite said overlying first body portion and confronting said locking section for maintaining said locking step beneath said overlying first body portion,
whereby said lid may not be moved from said closed non-dispensing position without severing said frangible means to separate said seal means from said lid.

## 4,941,593
## CLEANING SYSTEM FOR BEVERAGE DELIVERY CONDUITS

**Robert C. Hicks, 273 Green Hill Rd., Telford, Pa. 18969, and Raymond M. Benyaker, 117 Canterbury La., Lansdale, Pa. 19446**

**Filed Jan. 11, 1989, Ser. No. 295,760**
**Int. Cl.[5] B67D *1/08***
**U.S. Cl. 222—148** **8 Claims**



1. In combination with a beverage delivery system for delivering a beverage for a beverage source through conduits to a dispenser, an automatic cleaning system connected to said beverage delivery system to permit selective cleaning of said conduits comprising:

a. A source of pressurized water,

b. Multiple shuttle valves connected to said conduits for selectively connecting said beverage source to said dispenser through said conduits to permit beverage to be dispensed during a normal operation of said beverage delivery and to block the passage from said beverage source to said conduits during said cleaning operation,

c. a source of cleaning solution,

d. means for selectively connecting said pressurized water to cause water to flow through said conduits and said dispenser during said cleaning operation,

e. means connecting said source of cleaning solution to cause a predetermined amount of cleaning solution to be mixed with the water flowing through said conduits,

f. said predetermined amount of cleaning solution corresponding to the pressure of the water entering said conduits, and

g. means to measure the pressure of the water and the cleaning solution entering the conduits during the cleaning operation, the means to measure the pressure comprising a pressure gauge which provides information to effect a change of concentration of the cleaning solution.

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## 4,941,594
## DISPENSING-TUBE AND CAP HOLDER FOR USE IN COMBINATION WITH AN AEROSOL CAN

**Edwin L. Larson, 2501 Wellesley Ave., Los Angeles, Calif. 90064**

**Filed Jun. 2, 1987, Ser. No. 57,397**
**Int. Cl.[5] B67D *5/06***
**U.S. Cl. 222—192** **1 Claim**

1. A dispensing-tube and cap holder for use in combination with an aerosol can including a cylindrical container which has an annular sidewall, a top peripheral rim and a bottom peripheral rim, a valve which is fluidly coupled to the cylindrical container and a cap which is used for covering the valve when the aerosol can is not in use and a dispensing-tube which may be fluidly coupled to the valve, said dispensing-tube and cap holder comprising:

a. a curved, rectangular sheet having a front surface, a rear surface, a top edge, a bottom edge and two side edges the length of which is slightly shorter than the length of the cylindrical container;

b. sheathing means for holding the dispensing-tube, said sheathing means being disposed on one of said two side edges;

c. tube-tensioning means for securing the dispensing-tube in said sheathing means, said tube-tensioning means being

disposed on said front surface of said curved, rectangular sheet adjacent to said bottom edge;

d. cap-holding means for holding the cap, said cap-holding means being disposed on said front surface of said curved, rectangular sheet adjacent to said top edge; and

e. attaching means for attaching said curved, rectangular sheet to the cylindrical container so that it is mounted on the annular sidewall of the cylindrical container.

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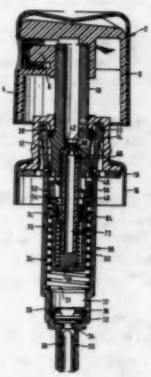
## 4,941,595
## SPRAY PUMP

**Pedro P. Montaner, and Victor R. Turró, both of Barcelona, Spain, assignors to Monturas A.S., Barcelona, Spain**

**Filed Aug. 14, 1989, Ser. No. 393,874**
**Claims priority, application Spain, Oct. 10, 1988, 8803075**
**Int. Cl.[5] B05B *11/02***
**U.S. Cl. 222—321** **4 Claims**



1. A spray pump of the type comprising: a main cylinder in which there is defined a pumping chamber; a main piston mounted to slide in said main cylinder between a first inactive position and a second end-of-stroke position, said piston being extended by a hollow rod and having a valve seat therein; first spring means urging said piston to said first position; a secondary cylinder comprised within the main cylinder and having a closed bottom and an open upper end; a secondary piston provided with an upper extension having an end in contact with said valve seat; said secondary piston being mounted to

slide within said secondary cylinder between a first closed position in which the end contacts the valve seat and a second open position, in which the end is not in contact with said valve seat; and a second spring means urging said secondary piston to said first position therefore, characterised in that there is a fixed connection between said main piston and said secondary cylinder, forming a space therebetween through which the pumping chamber and said secondary cylinder are in communication.

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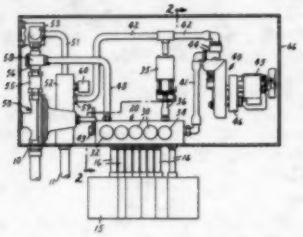
4,941,596

## MIXING SYSTEM FOR USE WITH CONCENTRATED LIQUIDS

John L. Marty, White Bear Lake, and Philip S. Plumbo, St. Paul, both of Minn., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Jul. 14, 1986, Ser. No. 884,994
Int. Cl.[5] B67D *5/60*
U.S. Cl. 222—144.5 2 Claims



1. A fluid dispensing system for dispensing a solution comprising a predetermined amount of a concentrate together with a carrier fluid, said system comprising

a closed manifold chamber for storing a quantity of carrier fluid,

a plurality of ports leading to said manifold chamber, each of said ports being connected by a valve to said manifold chamber and being connected to a supply of concentrate,

a first positive displacement pump connected to said chamber and operable upon each cycle of said pump to displace from said manifold chamber a predetermined volume of said carrier fluid and to replace it with an equal volume of concentrate;

a second positive displacement pump connected to said manifold chamber for pumping a second predetermined volume of fluid from said manifold chamber during each cycle, which second predetermined volume is different from that of said first pump during each cycle of operation;

a pressure regulator, said pressure regulator being adapted for connection to a source of carrier fluid and means for connecting said pressure regulator to said manifold chamber, said means including a valve for controlling the flow of fluid from said pressure regulator to said manifold chamber;

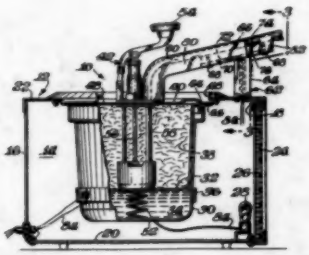
whereby, operation of said first pump and said second pump will draw predetermined amounts of concentrate through said ports into said manifold chamber and a predetermined amount of carrier fluid may be dispensed through said manifold chamber. cm 2. A fluid dispensing system according to claim 1 wherein said system comprises an output manifold having a passageway connected to receive discharge from said first pump and from said second pump and carrier fluid direct from said regulator.

4,941,597

## DISPENSER WITH HEATED SPOUT

David A. Lopez, Newark, Del., and Luther Toulson, Marydel, Md., assignors to Metal Masters Foodservice Equipment Co., Smyrna, Del.

Filed Oct. 25, 1985, Ser. No. 791,599
Int. Cl.[5] B67D *5/00*
U.S. Cl. 222—146.5 10 Claims



1. In a dispenser comprising a housing, a product container positioned within and supported by the housing, product heating means for maintaining the contents of the container at an elevated temperature, pump means for removing product from the container, a spout connected to receive product removed from the container by the pump, and spout heating means for maintaining the spout and the product contained therein at an elevated temperature whereby the product is maintained in a flowable state, the improvement according to which the spout heating means comprises a base upwardly extending from the housing and a heat conductive elongate block secured to the base, the block having opposite side surfaces and a top surface constructed and arranged to engage the underside of the spout in heat transfer relationship therewith, means heating the block, and a heat conductive sheath engaging the upper portion of the spout and the side surfaces of the block in heat transfer relationship therewith.

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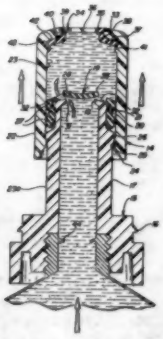
4,941,598

## DOSING CAP

Lawrence E. Lambelet, Jr., Flemington, N.J., and Thomas A. Frazier, Williamsport, Pa., assignors to Ortho Pharmaceutical Corporation, Raritan, N.J.

Filed Nov. 8, 1988, Ser. No. 268,416
Int. Cl.[5] B65D *35/28*
U.S. Cl. 222—321 7 Claims



1. A dosing and dispensing apparatus for supplying a mea-

sured dose of a viscous product from a container through an opening in the container comprising:

(a) means for sealingly attaching the apparatus to said container in communication with said opening;

(b) a conduit for communicating with said opening and for directing product out of said container into a dosing chamber;

(c) an expandable dosing chamber communicating with said conduit, having a predetermined minimum volume in a contracted position and a predetermined maximum value in an expanded position, said dosing chamber partially defined by a cap member which surrounds and slidably engages said conduit so as to be telescopingly received on said conduit;

(d) stops for restricting the sliding movement of said cap beyond an extended position where said cap and conduit define the expanded position of said dosing chamber;

(e) a check valve associated with said conduit and seated on a first end of said conduit to permit flow of product through said conduit into said dosing chamber and preventing flow out of said dosing chamber through said conduit said check valve including a depending skirt surrounding the outer surface of said first end of said conduit and sandwiched between said outer surface and said cap member to provide a seal therebetween;

(f) a discharge opening defined by said dosing chamber through which product is discharged from said dosing chamber when said dosing chamber contains product and is collapsed from its expanded position to its contracted position; and

(g) a back pressure means for controlling the flow of product out of said discharge opening by permitting flow of product out of said discharge opening when the pressure within the chamber is greater than that necessary to expand the chamber from its contracted position and substantially preventing flow when the pressure is no greater than that needed to expand the chamber from its contracted position.

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**4,941,599**

## METHOD AND APPARATUS FOR THOROUGHLY MIXING A SUSPENSION CONTAINING A FLUID AND SOLID MATTER CONSTITUENTS

**Ulrich Reinertz, Wuppertal; Wolfgang Tröger, Pulheim, and Jürgen Wockel, Wuppertal, all of Fed. Rep. of Germany, assignors to Vorwerk & Co. Interholding GmbH, Wuppertal, Fed. Rep. of Germany**

**Filed Dec. 15, 1988, Ser. No. 284,998**

**Claims priority, application Fed. Rep. of Germany, Dec. 15, 1987, 3742466**

**Int. Cl.[5] B65D *83/00***

**U.S. Cl. 222—401** **19 Claims**

1. A spray device for spraying a thoroughly mixed suspension of liquid and solid matter constituents onto a surface, the spray device comprising:

a pressure and seal tight container enclosed on all sides to define a chamber for accommodating the suspension therein, said container having a lower portion terminating in a base wall defining a base region of said chamber whereat said solid matter constituents tend to collect to form a sediment and said container also having an upper portion defining a top region of said chamber;

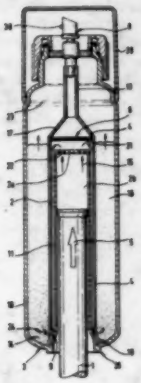
aperture means formed in said base wall for leading directly into said base region;

pressure charging means mounted on said container for pumping air into said chamber, said pressure charging means including a cylinder and a piston for generating a charge of air under pressure in said cylinder;

passage means connecting said cylinder to said aperture means for conducting said charge of air in a first direction from said cylinder to said aperture means so as to permit said charge to enter into said base region to break up said sediment and thoroughly mix said solid matter constituents in said liquid as the air under pressure rises in said chamber and through said suspension to collect in said top region of said chamber to impart pressure to said suspension;

said aperture means being formed only in said base wall so as to permit the full flow of sid charge of air to act on said sediment in said base region;

a nozzle unit mounted on said container and including nozzle



channel means leading from said passage means to the ambient; and, valve means for opening said nozzle channel means to the ambient to thereby vent said chamber and permit the air of said charge to entrain the thoroughly mixed suspension and flow out of said chamber through said aperture means and along said passage means in a second direction opposite said first direction and into said nozzle channel means to enter the ambient as a spray.

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**4,941,600**

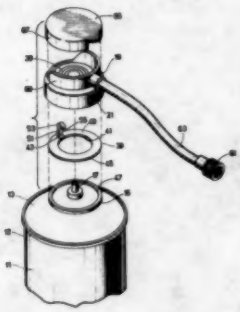
## DISPENSER LOCK ASSEMBLY FOR A PRESSURIZED CONTAINER

**Gary H. Berriochoa, Roanone, and Howard Dudley, Grapevine, both of Tex., assignors to Technical Chemical Company, Dallas, Tex.**

**Filed Aug. 31, 1989, Ser. No. 401,644**

**Int. Cl.[5] B65D *83/24***

**U.S. Cl. 222—402.13** **11 Claims**



1. A lock assembly for continuously dispensing the pressurized contents of an aerosol container of the type having an upstanding valve stem protruding from one end of the container, the lock assembly comprising:

a cap having a generally cylindrical skirt portion adapted for attachment to the container in a position surrounding the

stem, the skirt portion extending upwardly to define an interior recess;

an actuator tab hingedly connected to the cap within the interior recess and extending across the stem when the skirt is attached to the container, the actuator tab including a stem-engaging internal bore and a fluid passageway for connecting a stem so engaged to a discharge orifice;

a ring lock located within the cap interior recess below the actuator tab, the ring lock having a ring-shaped body with a central opening for receiving the valve stem and having a hook portion which extends upwardly from the ring-shaped body generally parallel to the valve stem for engaging the actuator tab when the actuator tab is depressed within the interior recess of the cap.

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**4,941,601**

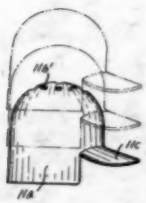
**CAP DRIER AND SHAPER**

**Ronald K. Thomas, and Judith A. Thomas, both of 1850 U.S. Hwy. 27 South, Avon Park, Fla. 32825**

**Filed Aug. 16, 1989, Ser. No. 394,475**

**Int. Cl.[5] A42C *1/00***

**U.S. Cl. 223—24** **2 Claims**



1. In combination a fabric cap and a cap drier and shaper comprising a continuous side wall blending into a crown, and a bill extending outwardly from and above a free edge of said continuous side wall, where a cut-out area in said continuous side wall beneath said bill serves a stacking relationship, and where said fabric cap overlies said continuous side wall, said crown and said bill in a drying and shaping relationship.

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**4,941,602**

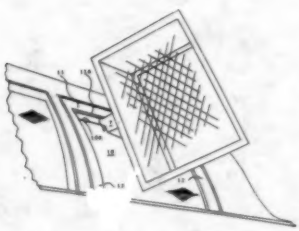
**AIR DRYING AIR CHILLING CONTAINER ATTACHABLE TO A CAR WINDOW**

**Todd A. Wells, P.O. Box 8382, Richmond, Va. 23226**

**Continuation-in-part of Ser. No. 124,581, Dec. 29, 1987, abandoned. This application Jul. 18, 1989, Ser. No. 402,386**

**Int. Cl.[5] B60R *9/00***

**U.S. Cl. 224—42.45 R** **5 Claims**



1. Apparatus for holding articles outside of an automotive vehicle while exposing them to the air stream resulting from movement of the vehicle, comprising a container having walls completely enclosing an interior chamber adapted to hold articles such as shoes and canned beverages, access means for accessing said chamber, and means for removably attaching the container to a window of a vehicle so that the container is held in a fixed position outside of the vehicle, said container walls having openings therethrough adapted to permit movement of air through the interior of the container while it is in said fixed position during travel of the vehicle to which the container is so attached.

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**4,941,603**

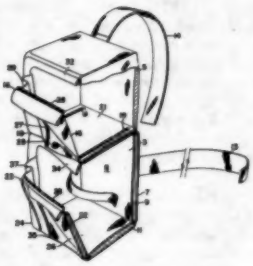
**INSULATED BACKPACK**

**John J. Creamer, 3207 Illinois Rd., Wilmette, Ill. 60091, and John Muller, 720 Mountain Rd., West Hartford, Conn. 06117**

**Filed Mar. 16, 1987, Ser. No. 26,114**

**Int. Cl.[5] A45F *3/04***

**U.S. Cl. 224—148** **3 Claims**



1. A backpack having a plurality of compartments including a thermally insulated for carrying cold articles within a lower end portion of said backpack, which has at least one other compartment located above said thermally insulated compartment, said backpack further comprising;

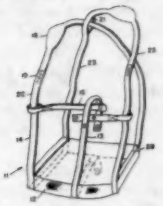
A. A housing, formed of a combination of semi-flexible, waterproof material and composite, insulating material, said composite material bbeing located between layers of said semi-flexible material to define a first wall structure, said housing also formed by said semi-flexible material to define a second wall structure, said thermally insulated compartment being defined by said first wall structure, for preventing thermal conductivity of said cold articles from reaching a wearer of said backpack, while maintaining a desired lower temperature of said articles, said at least one other compartment being defined by said second wall structure;

B. Carrying straps which are integrally attached to the front side of said housing, for adjustably adapting said backpack to said wearer;

C. A first access opening located at the rear side of said housing, leading into said other compartment, a second access opening, located at the rear side of said housing and leading into said insulated compartment, a sealable panel within said housing and defined by said first wall structure, one edge of said panel being pivotably attached to the rear side of said housing, the remaining edges of said panel being removably attached to the remaining wall structure of said housing so as to be in a horizontal position between said compartments;

D. Said sealable panel dividing said thermally insulated compartment and said other compartment whereby each compartment is accessible through its respective first and second access openings and both compartments are accessible through the first opening so as a large single compartment is obtained when said panel is detached from said housing and positioned in an upright position.

4,941,604
FRONT PACK INFANT CARRIER
Neil N. Nagareda, 1746 Malia St., Honolulu, Hi. 96819
Filed May 1, 1989, Ser. No. 345,228
Int. Cl.[5] A47D *13/02*
U.S. Cl. 224—160 12 Claims



9. A front pack child carrier comprising a thick cushioned seat having a covering extending around the seat and having an upper face, a bottom face, a front face, a rear face, and left and right side faces, first and second shoulder straps extending upward in loops between diametrically opposite corners, the first strap extending from a corner at the intersection of the front face and right side face to a corner at the intersection of the rear face and left side face, and the second shoulder strap extending from an intersection of the front face and left side face to an intersection of the rear face and right side face, a horizontal waist strap having looped ends for surrounding front portions of the shoulder strap above a front face of the seat and a vertical strap having a loop around the horizontal strap between the front portions of the shoulder strap and extending downward therefrom over the front face and beneath the bottom of the seat, and a strap extending from the rear of the seat for being held to the waist of the wearer wherein the strap which extends from then rear of the seat is an extension of the vertical strapk which extends from the horizontal strap downward around the seat bottom face and terminates in a loop which is attachable to a device extending around a wearer's waist.

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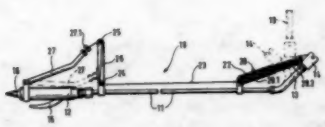
4,941,605
PRESSURE AIR TOOL FOR BLOWING THREADS INTO THREAD GUIDING PIPES
Heinz Brunner, Albstadt-Ebingen, and Waldemar Pacheliok, Albstadt-Tailfingen, both of Fed. Rep. of Germany, assignors to Sipra Patententwicklungs-und Beteiligungsgesellschaft mbH, Albstadt-Tailfingen, Fed. Rep. of Germany
Filed Sep. 12, 1988, Ser. No. 243,446
Claims priority, application Fed. Rep. of Germany, Sep. 16, 1987, 3731108; Feb. 1, 1988, 3802843
Int. Cl.[5] B65H *20/14*
U.S. Cl. 226—97 4 Claims



1. A pressure air tool for blowing threads into thread guiding pipes and comprising an air guiding pipe having opposite ends; a blowing head pivotably supported at one of said opposite ends of said air guiding pipe; a handle mounted on the other of said opposite ends of said air guiding pipe; and means for adjusting a position of said blowing head at said one of said opposite ends of said air guiding pipe, said adjusting means comprising a hand adjusting element supported on said handle and means for drivingly connecting said hand adjusting element with said blowing head, said blowing head including an end surface having a blowing opening and a plurality of slots extending radially of said blowing opening for receiving threads to be blown into a thread guiding pipe.

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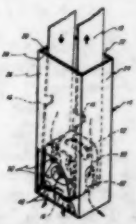
4,941,606
DEVICE TO STABILIZE A NOTCHED WEB IN A VACUUM BOX
Donald O. Bigelow, Webster, and Thomas W. Paloue, Rochester, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.
Filed Dec. 4, 1989, Ser. No. 445,229
Int. Cl.[5] B65H *20/24*; G11B *15/58*
U.S. Cl. 226—118 4 Claims



1. A device to stabilize a web with one or more openings, such as notches along the web as the web passes through a vacuum box, the box having walls defining an elongate chamber for receiving a loop of the web, the chamber having an opening through which the web enters and leaves the chamber, and vacuum means spaced from the opening for drawing air through the chamber so that the loop of web is held under tension in the chamber, the device comprising:

an endless ring of flexible material, the ring having a plurality of vent holes extending through the ring and spaced from each other, the holes being positionable within the loop of the web and being unattached to the vacuum box so that the ring is freely rotatable by the web in response to movement of the web through the chamber, the ring having an imperforate portion covering the opening in the web as the opening passes the ring so air is not drawn through the opening by the vacuum means as the opening passes the ring.

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4,941,607
MAGAZINE FOR CALENDER ROLLS
Jürgen Schlunke, Krefeld, Fed. Rep. of Germany, assignor to Kleinewefers GmbH, Krefeld, Fed. Rep. of Germany
Filed Dec. 8, 1988, Ser. No. 282,021
Claims priority, application Fed. Rep. of Germany, Dec. 14, 1987, 3742293
Int. Cl.[5] B65H *20/02*; B30B *30/00*
U.S. Cl. 226—189 15 Claims

1. A magazine for storage of calender rolls of the type having first and second end portions, comprising a pair of spaced-apart frame members; a row of substantially vertically spaced-apart mobile holders on each of said frame members, each holder on one of said frame members being disposed at the level of a holder on the other of said frame members and each holder having means for supporting one end portion of a roll, said holders being movable to and from predetermined retracted positions; means for moving said holders relative to the

respective frame members; and friction wheels provided on at least one of said frame members and operative to engage rolls

the end portions of which are carried by pairs of said supporting means in retracted positions of the respective holders.

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**4,941,608**

**HOT WATER SUPPLYING SYSTEM**

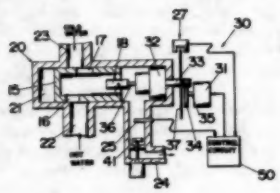
**Tomoyuki Shimizu, Himeji; Yoshikazu Taniguchi, Yamasaki; Motohiro Higuchi, Ako, and Masashi Suzuki, Tatsuno, all of Japan, assignors to Matsushita Electric Works, Ltd., Japan**

**Filed Dec. 11, 1989, Ser. No. 448,638**

**Claims priority, application Japan, Dec. 23, 1988, 63-326961; Dec. 23, 1988, 63-326962; Dec. 23, 1988, 63-326963; Dec. 23, 1988, 63-326964; Dec. 23, 1988, 63-326967**

**Int. Cl.[5] G05D *23/12***

**U.S. Cl. 236—12.12** **9 Claims**



1. A hot water supplying system comprising:

hot and cold water inlets adapted to be coupled respectively to hot and cold water sources;

an outlet;

a mixing chamber in fluid communication with said hot and cold inlets as well as said discharge outlet;

a mixing valve operatively connected to an electric motor to be thereby movable within said mixing chamber so as to vary the mixing ratio of the volume of the hot water to the cold water being fed from said hot and cold water inlets for discharging the water through said outlet,

controller means having input means to select a temperature of the water intended to be discharged from said mixing chamber through said outlet, said controller means controlling said motor, in accordance with a predetermined relation between a temperature scale determined in said controller means and the position of said mixing valve in said mixing chamber, to move said mixing valve into a suitable position in order to discharge the water at said temperature selected at said input means;

said mixing valve comprising a temperature-responsive actuator which adjusts the position of the mixing valve independently of the control of said controller means in response to the temperature of the water being discharged through said outlet for self-adjustment of the water temperature to said selected temperature;

said system further including an initial compensation means which comprises:

temperature sensor means for sensing the temperature of the water being discharged from said mixing chamber;

positioning means for driving said motor to move said mixing chamber to a reference position;

deviation detecting means which detects a deviation between the temperature of the water being discharged with said mixing valve at said reference position and the temperature designated at said controller means as corresponding to said reference position of said mixing valve;

offset means for determining and storing an offset value which corresponds to the shifting amount of said mixing valve required to maintain said deviation within an acceptable level;

compensation means for reestablishing, based upon said offset value, the relation between said temperature scale at said controller means and the position of said mixing valve within said mixing chamber in order to exactly associate the temperature to be selected at said controller means with the position of said mixing valve for discharging the water at a temperature as close as possible to the temperature to be selected at said controller means.

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**4,941,609**

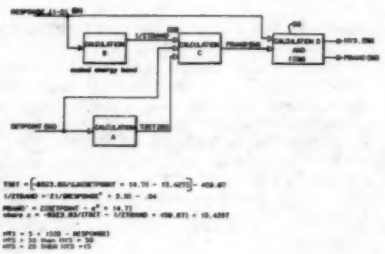
**METHOD AND APPARATUS FOR CONTROLLING FIRING RATE IN A HEATING SYSTEM**

**James I. Bartels, Hudson; Michael J. Seidel, Wauwatosa, and Paul A. Schimbke, Shorewood, all of Wis., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Jan. 27, 1989, Ser. No. 303,438**

**Int. Cl.[5] G05D *15/00***

**U.S. Cl. 236—78 D** **4 Claims**



1. In a method for controlling firing rate in a heating system to compensate for design thermal mass characteristics of the heating system, an improvement comprising the steps of:

deriving the design thermal mass characteristics of the heating system from heating system identification information identifying the heating system to be controlled;

selecting a weighted control response factor representative of load characteristics of a load type affecting firing rate control and representative of desired control tightness; and

controlling the firing rate, based on the weighted control response factor and the design thermal mass characteristics, to match the heating system, the load type being controlled and the desired control tightness for desired control.

4,941,610

## CONSTRUCTION PIECE FOR TOY VEHICLE TRACK

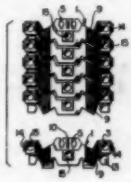
Vicente T. Franca, Cosejo de Ciento, Spain, assignor to Irwin Toy Limited, Toronto, Canada

Filed Feb. 1, 1989, Ser. No. 304,621

Claims priority, application Spain, Jun. 24, 1988, 8802034; Nov. 24, 1988, 8803501

Int. Cl.[5] E01B *23/00*

U.S. Cl. 238—10 A 5 Claims



1. A toy track piece capable of being joined with other identical pieces to form a toy vehicle track by having interengaging means for connecting a front side of one piece to the rear side of an identical piece, characterized by being laterally elongated and having on one face a segment of a generally flat road-type track for a toy road vehicle, said road-type track being defined at its sides by flange elements which project upwardly from each end portion of said track piece and which together with flange elements of said other identical pieces form flanges enclosing the track sides, and by having on the opposite face a pair of projecting rectangular segments which together provide rail tracks for a toy railway vehicle, said rectangular segments being located inwardly of said end portions of the track piece which carry the flange elements.

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4,941,611

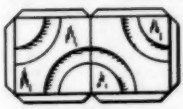
## TOY ROADWAY TILE

Duane R. Arsenault, 86 Prospect St., Gardner, Mass. 01440, assignor to Alan J. Kirby, Tyngsboro and Duane R. Arsenault, Gardner, both of, Mass.

Filed Nov. 17, 1986, Ser. No. 931,639

Int. Cl.[5] A63H *18/02*

U.S. Cl. 238—10 A 4 Claims



4. A toy roadway tile comprising:

(a) a main body having a top surface, a bottom surface and at least three straight edges of equal length,

(b) roadways defining a pattern on said top surface,

(c) configuration defining land areas on said top surface, and wherein said land areas are elevated above said roadways, and

(d) a tab plate attached to the bottom surface of said main body and having projections which extend beyond each of said straight edges of the main body, to provide means for engaging similar roadway tiles, wherein said bottom surface of the main body is attached to the tab plate inwardly of the main body's edges, so that the projection of said tab plate is fully inserted between the tab plate and main body of a similar roadway tile so that a straight edge of said similar roadway tile abutts a straight edge of said roadway tile, and whereby the patterns of roadways on the abutting roadway tiles are contiguous, wherein said roadway tile further comprises a second main body which is attached to the other surface of said tab plate, said second main body having a top surface, a bottom surface and at least three straight edges of equal length, and wherein said top surface of the second main body includes a pattern of roadway and a configuration of land areas, which are of a different pattern and configuration than the roadways and land areas of said first main body, and wherein said land areas of the second main body are elevated above said roadways of the second main body.

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4,941,612

## UNIT FUEL INJECTOR

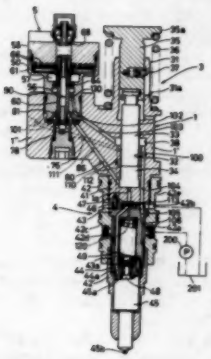
Xin-he Li, Higashimatsuyama, Japan, assignor to Diesel Kiki Co., Ltd., Tokyo, Japan

Filed Aug. 17, 1989, Ser. No. 395,432

Claims priority, application Japan, Sep. 1, 1988, 63-216350

Int. Cl.[5] F02M *55/02, 57/02*

U.S. Cl. 239—88 6 Claims



1. A unit fuel injector comprising:

(a) a body;

(b) pump means mounted on said body and including a cylinder hole formed in said body, and a plunger received in said cylinder hole so as to be reciprocally movable along said cylinder hole to achieve a pump stroke and a suction stroke, a pump chamber being defined by said cylinder hole and said plunger;

(c) injection nozzle means mounted on said body and including an injection port connected to said pump chamber, and an injection valve for controlling the communication between said injection part and said pump chamber, said injection valve being opened upon increase of the pressure within said pump chamber to a predetermined level, thereby injecting fuel from said injection port;

(d) electromagnetic valve means mounted on said body and including a guide hole formed in said body, and a spill chamber formed in said body and connected to said guide hole, a valve seat being provided between said guide hole and said spill chamber, said electromagnetic valve means further including a valve member received in said guide hole for sliding movement there along, and a solenoid drive means for controlling the movement of said valve member, said valve member having a stem portion and an abutment portion formed on said stem portion and disposed in said spill chamber, said stem portion having a reduced diameter portion adjacent to said abutment portion, an annular space being defined by said reduced diameter portion and an inner peripheral surface of said guide hole, said spill chamber being connected to said pump chamber via said annular space, said valve member being movable between a first position where said abutment portion is held away from said valve seat and a second position where said abutment portion is held against said valve seat, the communication between said spill chamber

and said pump chamber being interrupted when said valve member is moved from said first position to said second position during said pump stroke, thereby increasing the pressure within said pump chamber to start the injection of the fuel from said injection port, and said spill chamber and said pump chamber being communicated with each other via said annular space when said valve member is moved from said second position to said first position during said pump stroke, so that the fuel of high pressure within said pump chamber is spilled to said spill chamber to thereby terminate the fuel injection; and

(e) means for propelling said valve in such a direction that said abutment portion is moved away from said valve seat, said propelling means including a bore formed in said body, and a flange provided on an outer periphery of said stem portion of said valve member, said flange being slidably fitted in said bore to divide said bore into a pressure introduction chamber and a low pressure chamber along the axis of said valve member, said pressure introduction chamber being connected to said spill chamber so as to receive said spill fuel pressure in said spill chamber, said low pressure chamber being connected to a low pressure source disposed exteriorly of said body, the pressure of said low pressure source being lower than said spill fuel pressure, whereby said valve member is propelled in a direction away from said valve seat due to a pressure differential across said flange when said pressure introduction chamber receives said spill fuel pressure.

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**4,941,613**

## FUEL INJECTION NOZZLE

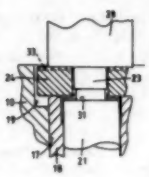
**Martin P. Hardy, and Paul Buckley, both of Gillingham, England, assignors to Lucas Industries public limited company, Birmingham, England**

**Filed Apr. 10, 1989, Ser. No. 335,356**

**Claims priority, application United Kingdom, Apr. 20, 1988, 8809268**

**Int. Cl.[5] F02M *47/00***

**U.S. Cl. 239—124** **9 Claims**



1. A liquid fuel injection nozzle for supplying fuel to an internal combustion engine, the nozzle being of the so called inwardly opening type and comprising:

a nozzle body;

a blind bore formed in the body and extending from one end thereof;

a seating defined at the blind end of the bore;

a fuel inlet passage communicating with the bore intermediate the ends thereof;

a sleeve slidable in the end portion of the bore remote from the blind end thereof;

a valve member means, having a portion slidable in the sleeve, and shaped for engagement with the seating, for controllably preventing fuel flow through an outlet;

a spring abutment engaged with the valve member means and engageable by the sleeve;

a spring engaged with the spring abutment such that when fuel under pressure is supplied through said inlet passage, the fuel pressure acting on said valve member means and the sleeve will effect movement of the valve member means and the sleeve against the action of the spring engaging the abutment to allow fuel flow through the outlet;

means defining a stop surface engageable by an end surface of the sleeve for limiting the movement of the sleeve, the further movement of the valve member being under the action of the fuel pressure acting on the valve member alone; and

means defining a leakage path extending from a zone defined within the annular area of contact between said end surface of the sleeve and the spring abutment.

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**4,941,614**

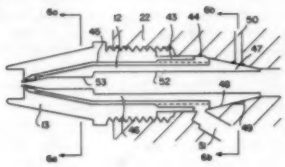
## NOZZLE FOR SPRAYING EQUIPMENT

**Jan Ilott, 14 Montague Hill, Kingsdown, Bristol, United Kingdom**

**Continuation-in-part of Ser. No. 948,357, Nov. 26, 1986, abandoned. This application Jul. 1, 1988, Ser. No. 215,194**

**Int. Cl.[5] B05B *1/28***

**U.S. Cl. 239—294** **14 Claims**



1. A nozzle, for a gas-operated spraying apparatus, said nozzle having an axial passage for paint to be dispensed;

a first end of said nozzle an outlet communicating with said axial passage;

a needle located in said passage, said needle having a tapered end projecting through said outlet;

said needle having a first end position wherein said tapered end forms a seal for said outlet;

said needle being arranged for movement from said first end position in a first direction axially of said passage progressively towards a second position;

said needle, in said progressive movement towards said second position, being arranged to unseal said outlet and to define an opening peripherally of said tapered end of said needle;

said needle, at least initially in said progressive movement, extending through said outlet to dispense paint;

said needle being arranged for movement in a second direction, opposite said first direction, from said first end position, to confirm said seal;

said nozzle being formed of a material having a resilient memory and said tapered end of said needle, on movement of said needle beyond said first end position in said second opposite direction, being arranged to expand said outlet of said nozzle but, on movement again of said needle in said first direction towards said second position, permitting said outlet of said nozzle to contract around said tapered end of said needle, under the influence of said resilient memory, to its original shape.

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**4,941,615**

## AEROSOL DISPENSER

**Lee R. Bolduc, 6416 Gainsborough Dr., Raleigh, N.C. 27612**

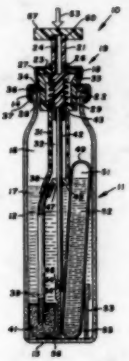
**Filed Oct. 3, 1988, Ser. No. 251,806**

**Int. Cl.[5] B67B *7/24***

**U.S. Cl. 239—309** **35 Claims**

1. An aerosol dispenser comprising: a container having a bottom wall, an open top, and a chamber for storing a propellant and first material under pressure, a cap mounted on the container closing said open top, a housing extended into the

chamber through said open top, said housing having a passage, control valve means mounted on the cap and housing operable to control the flow of propellant and material from said passage, said control valve means normally closed and having a movable member extended into the passage which can be moved to open said valve means whereby propellant and materials are dispensed from the container, a dip tube connected to the housing extended to the bottom portion of the chamber for carrying propellant and materials to the passage, a porous filter mounted on the dip tube to prevent foreign particles from flowing into the passage whereby when said



valve means is open the propellant and materials in said chamber flow through the filter and dip tube into the passage, frangible ampule means located within said chamber storing a second material separate from the first material until the ampule means is broken, sleeve means located in said chamber surrounding a portion of the ampule means, rod means connected to the movable member extended into said sleeve means, said rod means and sleeve means having engagable means whereby when the movable member is first moved to open the valve means the ampule is broken whereby the second material is mixed with the first material in said chamber.

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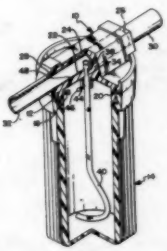
**4,941,616**

## LOW METERING RATE LIQUID DISPENSER

**Gar D. Liebler, 2661 B S. Lapeer, Lake Orion, Mich. 48035**

**Filed May 15, 1989, Ser. No. 352,042**
**Int. Cl.[5] B05B *7/30***
**U.S. Cl. 239—310** **3 Claims**



1. A dispenser for metering an additive into a liquid medium at a low rate comprising:

a vessel for holding an additive, the vessel having an opening,

a cap removably secured to the vessel opening to provide a closure for the vessel,

the cap having inlet and outlet means for coupling to a conduit and a flow passage connecting the inlet and outlet means,

a first aperture in the cap between the flow passage and the vessel opening,

a fibrous wick in the first aperture and extending into the flow passage and into the vessel, the portion of the wick in the vessel being exposed throughout its length to additive, whereby liquid additive is transported from the vessel to the flow passage through the wick, and

a second aperture in the cap between the flow passage and the vessel opening of smaller size than the first aperture to allow pressure equalization between the flow passage and the vessel.

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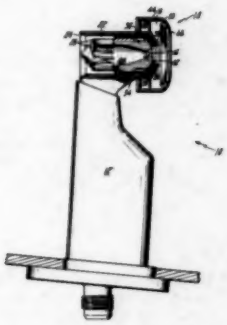
**4,941,617**

## AIRBLAST FUEL NOZZLE

**Sid Russell, Suffield, Conn., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Dec. 14, 1988, Ser. No. 284,270**
**Int. Cl.[5] B05B *7/04, 7/10***
**U.S. Cl. 239—400** **7 Claims**



1. A gas turbine fuel nozzle of the type in which fuel is injection into a core stream of atomizing air, wherein the improvement comprises:

means for injecting fuel radially inwardly into the core air stream, including a swirl chamber radially outwardly of the core stream and opening into the core stream and swirl means upstream of the swirl chamber across which fuel is flowable into the swirl chamber wherein the swirl chamber is of sufficient volume and orientation as to cause the formation of a swirling toroid of fuel and air within the chamber at low fuel flow rates.

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**4,941,618**

## NEBULIZER EMPLOYING A FINE MESH SCREEN

**Karl J. Hildebrand, Tyngsboro, and John Urh, Stoneham, both of Mass., assignors to Leeman Labs Inc., Lowell, Mass.**

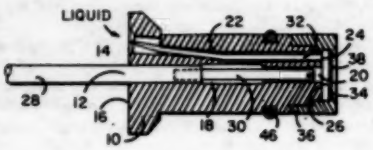
**Filed Jul. 7, 1986, Ser. No. 882,686**
**Int. Cl.[5] B05B *7/00***
**U.S. Cl. 239—432** **2 Claims**

1. A nebulizer for producing a quantity of fine liquid droplets from a liquid comprising in combination:

a. a nozzle for producing and directing a stream of gas;

b. a fine mesh screen positioned to receive said stream of gas, said screen of substantially greater area than that of the cross-section of said stream and the width of the mesh of

said screen substantially smaller than the diameter of said stream; and




c. means for flowing said liquid over said screen whereby said droplets are created by the shearing action of said stream impinging on said screen and said liquid.

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**4,941,619**

**METHOD OF SHREDDING CANS**

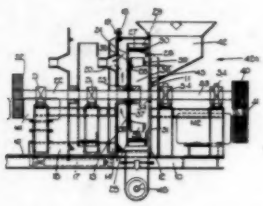
**William Cutler, Cleveland, United Kingdom, assignor to AMG Resources Corporation, Pittsburgh, Pa.**

**Continuation of Ser. No. 497,421, May 24, 1983, abandoned. This application May 31, 1985, Ser. No. 739,762**

**Claims priority, application United Kingdom, May 27, 1982, 8215599**

**Int. Cl.[5] B02C** *19/20*

**U.S. Cl. 241—22** **2 Claims**



1. A method of shredding cans, comprising the steps of feeding the cans to a chamber having an apertured peripheral wall and a rotor mounted in the chamber, effecting contra rotation of the chamber and the rotor; rotating the rotor at a sufficiently high rate of speed to throw the cans outwardly by impellers on the rotor so as to cause a bed of partly shredded cans to be established on the inside of the apertured peripheral wall of the chamber which bed is spaced outwardly of the impellers; reducing the size of the partly shredded cans in the bed by a shearing action within the bed of partly shredded cans caused by the rotation of the impellers and the contra rotation of the chamber as further cans are urged against the bed so that the fully shredded cans can pass through the apertures in the peripheral wall; and removing the fully shredded cans which have passed through the apertures.

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**4,941,620**

**APPARATUS FOR STORING FLEXIBLE WEBS ON THE CORES OF TAKEUP REELS**

**Herbert Wilsch, Unterhaching; Leonhard Huber, Glonn; Helmut Treiber, Munich; Peter Lermann, Weyarn, and Erich Nagel, Anzing, all of Fed. Rep. of Germany, assignors to AGFA-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

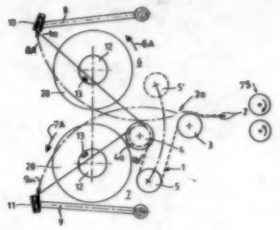
**Filed Feb. 23, 1989, Ser. No. 315,468**

**Claims priority, application Fed. Rep. of Germany, Feb. 26, 1988, 3806200**

**Int. Cl.[5] B65H** *18/10, 20/02*

**U.S. Cl. 242—67.1 R** **12 Claims**

1. Apparatus for storing elongated flexible webs in convoluted condition, particularly for storing webs which contain a photosensitive material and have leaders, comprising means for advancing successive webs along a predetermined path having a discharge end so that the leaders of such webs assume predetermined positions at the discharge end of said path; at least one rotary driving member adjacent said discharge end; means for driving and separably coupling said rotary driving member with a takeup reel, the takeup reel comprising a cylindrical core having a first end, a second end, and a peripheral surface; a protuberance mounted at a predetermined location adjacent said rotary driving member; means for moving said protuberance with respect to the core of the takeup reel which is coupled to said at least one driving member between a first position in which said protuberance is adjacent to the peripheral surface of the core and defines therewith a gap and at least one second position in which said protuberance is remote from the peripheral surface of the core, the takeup reel being detachable from said at least one driving member and separable from said protuberance; and means for transferring the leader of the web from said discharge end of said path to a position against the peripheral surface of the core of the takeup reel which is coupled to said at least one driving member so that, upon movement of said protuberance; and means for transferring the leader of the web from said discharge end of said path to a position against the peripheral surface of the core of the takeup reel which is coupled to said at least one driving member so that, upon movement of said protuberance to said first position, the leader of the web being located in said gap, whereby rotation of said rotary driving member causes the web to be wound over said protuberance and convoluted onto the peripheral surface of the core of the reel which is coupled to said at least one driving member.



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**4,941,621**

**AXIALLY COMPRESSIBLE SPOOL**

**Roberto Pasini, Milan, Italy, assignor to Tubettificio Europa S.p.A., Milan, Italy**

**Filed Jun. 13, 1989, Ser. No. 365,298**

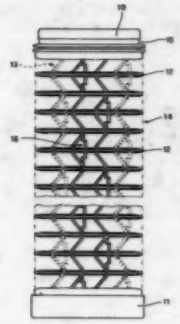
**Claims priority, application Italy, Jun. 30, 1988, 21164 A/88**

**Int. Cl.[5] B65H** *75/20*

**U.S. Cl. 242—118.1** **12 Claims**

1. A spool for winding yarn the spool having an axially compressible body comprising end annular members and a plurality of intermediate ring members, said annular members and said intermediate ring members being coaxially arranged and connected by yielding spacer members defining a winding surface for the yarn, said spacer members being peripherally arranged on the spool body, and comprising at least one inclined portion with respect to the longitudinal axis of the spool body; stiffening means being provided between contiguous intermediate ring members, said stiffening means comprising breakable members parallelly arranged to the longitudinal axis

of the body of the spool, and stop means between contiguous ring members to limit the axial compression of the spool body,



said stop means comprising apposite breakable portions of said stiffening members.

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**4,941,622**

**PACKAGE ADAPTER**

**James L. Alexander, 1024 N. Tryon St., Charlotte, N.C. 28206**

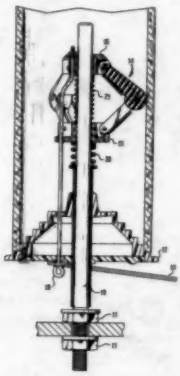
**PCT No. PCT/US88/02155, § 371 Date Nov. 6, 1989, § 102(e) Date Nov. 6, 1989, PCT Pub. No. WO88/10229, PCT Pub. Date Dec. 29, 1988**

**PCT Filed Jun. 22, 1988, Ser. No. 435,494**

**Claims priority, application Australia, Jun. 26, 1987, P12732**

**Int. Cl.[5] B65H *49/06***

**U.S. Cl. 242—129.7** **10 Claims**



1. An apparatus for receiving and engaging a package of strand material wound about an elongate hollow core and comprising:

an elongate central shaft means having a free end,

a core end engaging rear support means mounted on said shaft means for movement therealong and for forming a sliding abutment for engaging an end of a package core positioned encircling said shaft means,

a plurality of finger means mounted on said shaft means for movement relative thereto between retracted positions drawn toward the axis of said shaft means and extended positions urged outwardly into engagement with the inside diameter of a package core positioned encircling said shaft means, and

means operatively interconnecting said rear support means, said finger means and said shaft means for moving said finger means from said retracted positions toward said extended positions upon movement of said rear support means along said shaft means in a direction away from said free end and for releasably latching said rear support means and said finger means in positions engaging the end and inside diameter of an elongate hollow core positioned encircling said shaft means.

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**4,941,623**

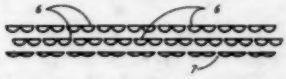
**STAPLING PROCESS AND DEVICE FOR USE ON THE MESENTERY OF THE ABDOMEN**

**J. Crayton Pruitt, St. Petersburg, Fla., assignor to United States Surgical Corporation, Norwalk, Conn.**

**Continuation-in-part of Ser. No. 350,758, May 12, 1987, which is a continuation-in-part of Ser. No. 237,433, Aug. 26, 1988, Pat. No. 4,848,637, which is a continuation-in-part of Ser. No. 60,469, Jun. 11, 1987, abandoned, which is a continuation-in-part of Ser. No. 864,336, May 19, 1986, abandoned. This application Dec. 26, 1989, Ser. No. 456,361**

**Int. Cl.[5] B31B *1/00***

**U.S. Cl. 227—19** **18 Claims**



1. In a stapling device designed for use on a patient which comprises:

(a) a handle by which the device may be held in the operator's hand;

(b) a sleeve having a forward and a rear end thereto, which sleeve is connected at a point near its rear end to said handle at an angle of about 90°–100°, at which point said handle is slidably mounted at the interior of said sleeve, and said sleeve having a knob extending from the rear end thereof;

(c) a shaft extending lengthwise and inside said sleeve and being connected at one end to said handle adjacent to the area where said handle is slidably mounted on said sleeve;

(d) an adjusting means for advancing said shaft toward the forward end of said sleeve and for retracting said shaft toward the rear end of said sleeve, said adjustment being effected by the axial rotation of said knob extending from the rear end of said sleeve;

(e) a cartridge holding means attached to and positioned perpendicularly from the opposite end of said shaft from the end connected to said handle, said cartridge holding means being capable of being advanced and retracted with said shaft movement;

(f) a support means extending downward and forward from the front end of said sleeve;

(g) an anvil held by said support means in a position parallel to and opposite to said cartridge holding means;

the improvement whereby said stapler device is suitable for use on a patient's mesentery which comprises:

(h) a cartridge positioned on said cartridge holding means having at least two and no more than four parallel rows of staples, each staple having crown and two prongs each

prong being attached to an end of said crown, each intermediate row of staples being substantially equidistant from adjacent rows, with the staples in each row having the same length of crown and each crown being staggered at the quarter point in the length of the crown of the adjacent staple in the adjacent row of staples; whereby the ends of looped prongs are opposite the approximate midpoint of a looped prong on an adjacent row, and

(i) an anvil having grooves therein spaced from and positioned opposite to and facing the prongs of the staples in said cartridge and positioned to receive and to turn the prongs of each said staple toward each other and toward the crown of said staple.

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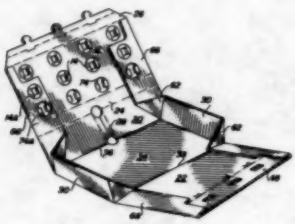
**4,941,624**

## WRAP-AROUND CARRIER WITH HANDLE

**Richard L. Schuster, Monroe, La., assignor to Manville Corporation, Denver, Colo.**

**Filed Oct. 5, 1989, Ser. No. 417,344**
**Int. Cl.[5] B65D 5/46**
**U.S. Cl. 229—117.13** **27 Claims**



1. A wrap-around article carrier, comprising:

a bottom panel having side edges and end edges;

side panels connected to the side edges of the bottom panel by fold lines;

end panels connected to the end edges of the bottom panel by fold lines;

a top panel connecting the side panels;

at least one of the side panels having an angled upper portion adjacent the top panel, the angled portion forming an obtuse angle with said one side panel and an obtuse angle with the top panel, the angled portion being connected to the top panel; and

said one side panel containing a handle opening comprising two elongated spaced edges extending transversely of said one side panel between the angled portion of said one side panel and the bottom panel, the handle opening being large enough for the fingers of a user to be inserted in order to lift the carrier from the underside of said one side panel adjacent one of the elongated spaced edges of the handle opening.

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**4,941,625**

## CREEL FOR THE SIMULTANEOUS CHANGING OF REELS OF METALLIC WIRE

**Giancarlo Saro, Ceresetto Di Martignacco, Italy, assignor to Impianti Industriali SpA, Osoppo, Italy**

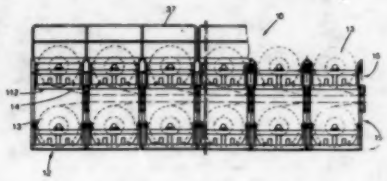
**Filed Jun. 17, 1988, Ser. No. 208,036**
**Claims priority, application Italy, Jul. 3, 1987, 83400 A/87**
**Int. Cl.[5] B65H 49/20, 67/00**
**U.S. Cl. 242—131** **14 Claims**

1. Creel for simultaneous changing of reels of metallic wire for cooperating with metallic mesh production machines, comprising:

a structure including a first lower tier and a second upper tier, said second upper tier parallel to and superimposed on said first lower tier;

a plurality of lower support units for supporting reels of wire, positioned in a lengthwise sequence on said first lower tier; and

a plurality of upper support units for supporting reels of wire, positioned in a similar manner as said lower support units in a lengthwise sequence on said second upper tier,



the number of the upper support units equal to the number of the lower support units;

said upper support units and said lower support units each comprising a fixed portion fixedly connected to said structure and a movable portion for moving crosswise to the lengthwise direction of the structure.

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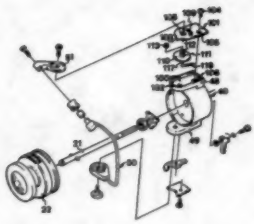
**4,941,626**

## BAIL MECHANISM IN AN OPEN-FACE FISHING REEL OF THE FIXED-SPOOL TYPE

**Karl L. Carlsson, Asarum, Sweden, assignor to Abu Garcia Produktion AB, Svangsta, Sweden**

**Filed Oct. 27, 1989, Ser. No. 427,435**
**Int. Cl.[5] A01K 89/01**
**U.S. Cl. 242—231** **4 Claims**



1. A bail mechanism in an open-face fishing reel of the fixed-spool type having a housing, a rotor mounted on said housing, and a line spool coaxial with said rotor and adapted to oscillate in the axial direction, said bail mechanism comprising

a bail for winding a line onto said line spool;

two attachments arranged on said rotor substantially diametrically opposite each other; and

two mounting elements carrying said bail and being so rotatably mounted on a respective one of said attachments that said bail is pivotable about a bail axis substantially at right angles to the axis of said rotor, between a folded-in line winding position and a folded-out position in which said bail is released of the line;

at least one of said attachments being designed so as to form an open chamber and having a cover plate detachably mounted over said chamber for closing it;

said cover plate having a through hole whose center is located on said bail axis, and supporting on its inside a rotary disc having a center pin extending through said hole in said cover plate and non-rotatably connected to the associated mounting element for carrying this element on the outside of said cover plate;

a tension spring being mounted between two spring holders, one of which is eccentrically mounted on the side of said

rotary disc facing said chamber, and the other of which is mounted on the inside of said cover plate; and

said rotary disc being rotatable against the action of said tension spring, between two positions corresponding to said folded-out and said folded-in position of said bail.

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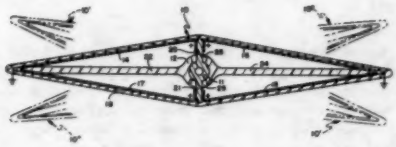
**4,941,627**

## GUIDANCE AND CONTROL FIN

**William M. Moscrip, King George County, Va., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Dec. 16, 1975, Ser. No. 641,116**
**Int. Cl.[5] F42B *10/64***
**U.S. Cl. 244—3.21** **7 Claims**



1. A self-actuating control fin for steerable vehicles operable in a fluid medium comprising:

a shaft formed of electrically insulating material adapted to be rigidly secured to the body of the missile or projectile;

a pair of short arms formed integral with said shaft and projecting therefrom in opposite directions and normal to the plane of the fin;

a hollow rigid rotor encompassing said shaft and mounted for oscillation thereon;

a pair of long arms formed integral with said rotor and projecting therefrom in opposite directions in the plane of the fin; and

a plurality of sections of memory effect alloy each fastened to the tip of one shaft arm and one rotor arm to define a fin of rhombical cross-section, said alloy sections having been previously stretched at a temperature below its critical transition temperature whereby resistive dissipation of an electric current in opposite sides, in a rhombic sense, will cause shortening of these sides and consequent deflection of the fin to change its angle of attack.

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**4,941,628**

## LIFT GENERATING APPARATUS, IN AIRCRAFT EMPLOYING THE LIFT GENERATING APPARATUS, AND A LIFT GENERATING METHOD

**Yujiro Sakamoto, Akashi; Toshio Kurosaka, Takarazuka; Hirohiko Fukumoto, Kobe; Toshiya Miyake, and Hirohiko Tokunaga, both of Kakogawa, all of Japan, assignors to Kabushiki Kaisha Kobe Seiko Sho, Kobe, Japan**

**Filed Feb. 2, 1989, Ser. No. 305,019**
**Claims priority, application Japan, Feb. 2, 1988, 63-23310; Jul. 20, 1988, 63-180686**
**Int. Cl.[5] B64C *39/06***
**U.S. Cl. 244—12.2** **13 Claims**

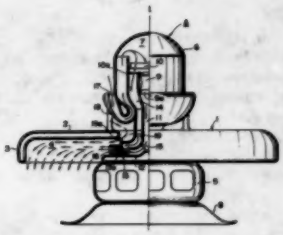
1. A lift generating apparatus comprising:

a circular principal wing having a peripheral portion thereof bent downward, forming a space opening downwardly thereunder;

a high-pressure gas producing device provided on the principal wing,

a plurality of jet nozzles provided within a central portion of the space for jetting a high-pressure gas compressed by said gas producing device and jetting by said gas producing device in a direction radially outward from the central portion of the bowl-shaped space;

a plurality of suction nozzles disposed coaxially with said jet nozzles, said suction nozzles being communicated with said gas producing device for sucking external air as a secondary fluid from outside the bowl-shaped space by



suction generated by jets of the high-pressure gas jetted from the gas producing device.

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**4,941,629**

## SUPPORT DEVICE FOR A HOSE ADAPTER

**Chris C. Horn, HCO 1 Box 16, Niland, Calif. 92257-9705**

**Filed Jun. 20, 1989, Ser. No. 368,552**
**Int. Cl.[5] F16L *3/00***
**U.S. Cl. 248—62** **2 Claims**

1. A support device for a recreational vehicle sewer hose adapter, comprising:

(a) an expandable ring having intersecting terminal ends;

(b) a hook formed supplemental in a continuation of one of said terminal ends, which hook extends outwardly from the ring and lies generally in the same plane as the ring;

(c) structural resilience in said expandable ring allowing forced circumferential enlargement of said expandable ring maintained generally circular with said structural resilience providing return of said expandable ring to a remembered circumferential dimension;

(d) a ring support plate attachable to said recreational vehicle with said ring support plate having a protruding cover providing a through passageway behind said cover, said passageway adapted for releasable locking attachment of said hook with said ring fitted around the hose adapter.

4,941,630

## ISOLATING PIPE STRAP FOR PLUMBING PIPES

Joseph A. Albano, 1595 Ridley St., Santa Rosa, Calif. 95401

Filed Feb. 28, 1989, Ser. No. 316,780
Int. Cl.[5] F16B *15/00*
U.S. Cl. 248—71 2 Claims

1. An isolating pipe strap, comprising

two substantially divergent rod-like support arms continuously connected centrally at a bight section;

said support arms angling outward from said bight section in a common plane;

said support arms having distal ends bent at substantially right angles into parallelling short sharpened shanks;

said sharpened shanks being means for attachment of said strap to a support surface;

said bight section forming an outer loop and having said outer loop encased in dielectric insulation;

said bight section affixed with pipe insulation;

said pipe insulation being an elongated cylindrical section of resilient material affixed as an inner loop in said bight section attached by a portion thereof to said dielectric insulation;

said pipe insulation having a cut therethrough providing a separation of said cylindrical section allowing an overlapping of the pipe insulation over a pipe.

4,941,631

## SEMI-MICRO MANIPULATOR

Donald W. Misch, Department of Biology, Coker Hall 010A, Campus Box 3280, University of North Carolina; Irvine R. Hagadorn, deceased, late of Northwood Dr.; by Thomas D. Higgins, III, legal representative, 820 Airport Rd., all of Chapel Hill, N.C. 27514; William M. Darby, 9701 A Reichsford Rd., Ijamsville, Md. 21754, and Murray S. Swanson, 9549 Longs Mill Rd., Rocky Rodge, Md. 21778

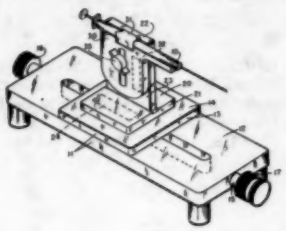
Filed Jul. 10, 1988, Ser. No. 75,900
Int. Cl.[5] F16M *11/00*
U.S. Cl. 248—178 8 Claims

1. An apparatus for manipulating devices requiring precise positioning comprising:

(a) a base, the base comprising a stand and a plate slidably attached for translational movement along the stand, wherein the plate is provided with a metallic face plate attached to the side of the plate opposite the side of the plate slidably attached to the stand;

(b) means attached to the stand and the plate for controlling the translational movement of the plate in relation to the stand;

(c) a pedestal slidably attached to the metallic face plate, the pedestal comprising a horizontal member which is slidably attached to the metallic face plate and a vertical plate member, wherein the horizontal member comprises at least one magnetic element attached to the side of the horizontal member in contact with the metallic face plate for allowing the slidable positioning of the pedestal on the metallic face plate, and wherein the vertical plate member is provided with a second metallic face plate attached to one side of the vertical plate member;



(d) second plate means attached to the pedestal for adjustably supporting the devices requiring precise positioning, wherein the second plate means comprises at least one magnetic element attached to the side of the second plate means in contact with the second metallic face plate so that the second plate means is slidably attached to the second metallic face plate and so that the second plate means can be rotationally and translationally moved to another position on the second metallic face plate; and

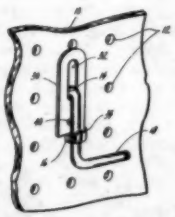
(e) means for controlling translational and rotational movement of said second plate means relative to the second metallic face plate.

4,941,632

## PEGBOARD HOOK RETAINING CLIP

Donald E. Couls, 48150 Furgot, Utica, Mich. 48087, and William J. Love, 32129 Block, Garden City, Mich. 48135

Filed Dec. 30, 1988, Ser. No. 292,446
Int. Cl.[5] A47B *96/06*
U.S. Cl. 248—221.2 8 Claims



1. A retaining clip adapted for use with a pegboard hook mounted on a pegboard having first and second spaced apertures, the hook having an elongated shank supported parallel to the board, the hook having a first end and an integral elbow adjacent said first end receivable in the first aperture such that the first end of the hook is disposed on the opposite side of the pegboard as the shank, the hook having a finger receivable in the second aperture, the hook being removable from the pegboard by swinging the finger out of the second aperture and about said elbow, said retaining clip comprising:

an elongated plate-like body having a first end and a second end, the body having a longitudinal closed slot having a first slot end and a second slot end, the first slot end being disposed adjacent the first end of the body, the body having a tab retaining spaced from the second end of the slot a distance less than the distance between the elbow and the finger on the pegboard hook such that the clip body is receivable therebetween, the tab having a concave opening for receiving the shank of the hook by a motion of the clip body in a direction parallel to the board to a locked position in which the first end of the clip body is spaced from the hook's elbow and on the opposite side thereof as the tab, and the first end of the clip body is disposed on the pegboard on the opposite side thereof as the first end of the hook,

whereby the tab releasably prevents the finger on the hook from being swung out of the second pegboard aperture.

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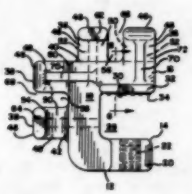
**4,941,633**

## ROPE SUPPORT DEVICE

**Robert L. Walker, 20 White Oaks Cir., St. Charles, Ill. 60174, and William E. Homan, 302 Center Pkwy., Yorkville, Ill. 60560**

**Filed Nov. 21, 1986, Ser. No. 934,508**
**Int. Cl.[5] F16L *3/00***
**U.S. Cl. 248—228** **6 Claims**



1. A support device particularly adapted for attachment to a structural column of a building under construction to in part hold a length of high-strength rope guard rail strung about said building, said support device comprising:

a body having means prepared for ready attachment to said structural column and said body including a first end segment connected to a side segment to define an L-like shape,

a set of spaced apart clips formed as part of said first end segment and a further pair of said clips formed as part of said side segment with said clips of said sets respective extending outwardly from said first end and said side segment, each said clip having an outer end strap joined to said body by a connecting strap to form a holding area with said holding areas of each said clip set positioned respectively to face in an opposite direction, and said holding areas of said clips spaced on each side of a radiused corner formed at a joiner of said first end segment and said side segment positioned to face in an opposite direction,

a rope passageway defined by alignment of said clips holding areas and said radiused corner, and

an access opening formed respectively between said clips of each said set to allow selective movement of said rope to and from said rope passageway,

wherein a series of said support devices may be attached selectively one each to a series of said building structural columns to form a series of support points for said rope length positioned about an exterior of said building, as attached said rope being carried in one said clip set of those support devices attached to structural columns positioned between further structural columns defining outside corners of said building, and said rope being carried in both said clip sets of those support devices attached to said corner structural columns.

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**4,941,634**

## MOUNTING APPARATUS FOR EYEGLASSES

**Gary D. Gomes, Alameda County; Craig M. Gomes, San Mateo County; Frank M. Figone, San Mateo County, and Moira J. Figone, San Mateo County, all of Calif., assignors to GFS, Inc., San Mateo, Calif.**

**Filed Jan. 9, 1989, Ser. No. 295,814**
**Int. Cl.[5] A47B *96/00***
**U.S. Cl. 248—229** **5 Claims**

1. Apparatus for mounting eyeglasses to an object comprising:

a shaped body including a slot defined by at least one composite resilient finger, said composite resilient finger including U-shaped spring means embedded within said body and said finger and surrounding said slot to resiliently bias said finger to a position closely proximate said body for receiving and holding eyeglass bridges of different sizes, and said composite resilient finger and said body defining said slot being formed of a material which is soft and compliant relative to plastic eyeglass materials to resist scratching eyeglasses; and

a jaw formed in the lower portion of said body, said jaw providing means to secure the body to an object to support eyeglasses whose bridge is placed in the slot on the object.

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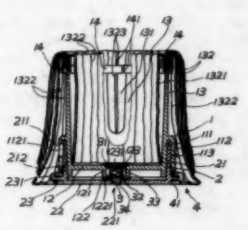
**4,941,635**

## CUP-HOLDER STABILIZER

**Yung-Huei Lan, 3F No. 32 Lane 61 Sec.2 Hang-Chuo S.Rd., Taipei, Taiwan**

**Continuation-in-part of Ser. No. 818,368, Jan. 13, 1986, Pat. No. 4,760,987. This application May 10, 1988, Ser. No. 191,899**
**Int. Cl.[5] A45D *42/14*; F16B *47/00***
**U.S. Cl. 248—346.1** **2 Claims**



1. A cup-holder stabilizer for holding a cup and the like on a flat surface, comprising:

an upper holder portion, having an outside surface and including an upper cylinder which has an upper portion and a lower portion, said upper portion of said upper

cylinder having an upper end, said lower portion of said upper cylinder including an outer fold wall and an inner fold wall connected together at respective upper ends thereof, said outer and inner fold walls having respective portions other than said connected upper ends thereof separated by a first distance so as to define a ring-shaped space between said other portions of said outer and inner fold walls, said inner fold walls defining therein a first inner cylindrical space which is adapted for reception of said cup and the like to be held, said inner fold wall being provided at a lower end thereof with a first base plate which has on a central portion thereof a small cylinder projecting downwardly from said central portion of said first base plate, said small cylinder having a second inner space, said outer fold wall being provided with an elongated slot having a longitudinal length in the height direction of said outer fold wall;

a plug having a lower portion and a top end and configured to be adapted to be received in said second inner space of said small cylinder, said small cylinder having a lower end which is provided with a second base plate having in a central portion thereof a first small bore of such an inner diameter as to allow said lower portion of said pug to pass therehtrough, said top end of said plug being provided with a flange having an outside diameter larger than said inner diameter of said first small bore so as to prevent said plug from dropping out via said first small bore, said small cylinder having an upper end which is provided with a cover plate, said top end of said plug having in a top surface thereof a dent which has a bottom surface and is configured to be adapted to receive a coil spring having an upper end and a lower end, said upper end of said coil spring being rested against said cover plate while said lower end of said spring is arranged to urge against said bottom surface of said dent to push said plug downward;

a lower cylinder, which is configured to be allowed to fit into and to slide along said ring-shaped space between said outer and inner fold walls, said lower cylinder having an outside surface which is provided in a top end portion thereof with a protrusion configured and arranged to fit into said elongated slot of said outer fold wall of said upper cylinder so that, when said upper cylinder is moved in one of an upward and downward directions with respect to said lower cylinder, said protrusion may slide along said elongated slot in the other one of said upward and downward directions with the travel distance of said protrusion being limited within said longitudinal length of said elongated slot, said lower cylinder having a lower end which is provided with a third base plate having a second small central bore configured and arranged so that is may be sealed by said lower portion of said plug, said lower end of said lower cylinder being provided peripherally with an outer circular flange;

a skirt-shaped piece configured and arranged to be fitted around said outer circular flange at said lower end of said lower cylinder so as to form together with said third base plate a cupule adapted to suctorially attach to the flat surface; and

a thin cylinder connected to said upper end of said upper portion of said upper cylinder and provided with a separable adapter having multi-layered skirt-shaped soft pads which may be moved between a first position, in which they are outside said upper holder portion, and a second position, in which they are in said first inner cylindrical space, said pads being formed and arranged to be used to cover said outside surface of said upper holder portion when they are moved to said first position and to be used to serve for padding purpose when they are moved to said second position, said pads being formed in one of the forms of a net form, a strip form, a surrounding arranged tubular form and a combination thereof;

whereby, when said upper and lower cylinders are driven to move toward each other by reception of said cup in said first inner cylindrical space and deposition of said cup-holder stabilizer on the flat surface, said lower portion of said plug will be brought to seal up said second small central bore in said third base plate so as to allow said cupule formed together by said third base plate and said skirt-shaped piece to suctorially attach to the flat surface; when said upper and lower cylinders are driven to move apart from each other by lift of said upper cylinder from the flat surface, said second base plate will be brought in touch with said flange of said plug and then pull said plug up so that said second small central bore of said third base plate is opened to disable the suctorial attachment effect of said cupule to the flat surface so as to allow said cup-holder stabilizer to be lifted up.

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**4,941,636**

## LOCKING SLIDE APPARATUS FOR MOUNTING A SEAT

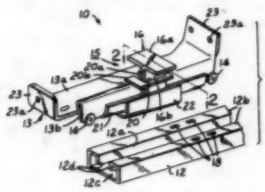
**Mikio Fujiwara, and Minoru Komohara, both of Ayase, Japan, assignors to Ikeda Bussan Company Ltd., Kanagawa, Japan**

**Filed Jul. 24, 1989, Ser. No. 384,401**

**Claims priority, application Japan, Sep. 16, 1988, 63-121231[U]**

**Int. Cl.[5] A62B *35/60***

**U.S. Cl. 248—430** **4 Claims**



1. A locking slide apparatus for mounting a seat in a vehicle, the locking slide apparatus comprising:

an elongated stationary rail securable to a vehicle floor, said stationary rail having an upper horizontal side, a lower horizontal side and two vertical sides defining a substantially rectangular cross section, said upper horizontal side having a slot longitudinally disposed therein and extending along at least a portion of the length thereof, said upper horizontal side further having a row of lock holes extending vertically therethrough and along at least one side of the slot to form a linear rack;

a slide mechanism supported by and longitudinally slidable along said stationary rail, said slide mechanism including an elongated horizontal slide member, said horizontal slide member having two vertical slide members depending therefrom along a substantial portion of a longitudinal border thereof, said horizontal slide member further having a guide piece extending vertically upward from said horizontal slide member, said guide piece being coplanar with and longitudinally spaced between said two vertical slide members, said vertical slide members extending downwardly from said horizontal slide member through said slot in said upper horizontal side of said stationary rail, each of said vertical slide members supporting a horizontally aligned shaft upon which is rotatably mounted a roller on each side of said vertical slide member, said rollers being rotatably disposed between said upper horizontal side and said lower horizontal side of said stationary rail, said slide mechanism being adapted to support the seat thereon;

a lock mechanism having a vertical member supported by and vertically slidable along said slide mechanism, a horizontal lower flange connected to said vertical member, and at least one pawl connected to and extending vertically upward from said lower flange to inserted upwardly into a vertical lock hole in said upper horizontal side of

said stationary rail to prevent said slide mechanism from sliding along said stationary rail;

means for resiliently biasing said lock pawl in an upward direction to urge said lock pawl into a vertical lock hole in said upper horizontal side of said stationary rail; and

a guide plate connected to said slide mechanism proximate said guide piece, said guide plate being substantially C-shaped to define, in cooperation with said guide piece, a guide hole through which said vertical member of said lock mechanism is slidably guided.

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**4,941,637**

## SAFETY SLIDE WITH ROLLERS FOR VEHICLE SEATS

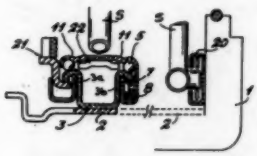
**Yves Pipon, St. Georges des Groseillers, France, assignor to A. & M. Cousin - Etablissements Cousin/Freres, France**

**Filed Mar. 3, 1989, Ser. No. 318,269**

**Claims priority, application France, Mar. 22, 1988, 88 03690**

**Int. Cl.[5] F16M *13/00***

**U.S. Cl. 248—430** **3 Claims**



1. A safety slide for vehicle seats comprising a lower fixed profile and an upper mobile profile, wherein the upper mobile profile has stiffening longitudinal corrugations, and the lower fixed profile is of a U-shaped section and is formed with vertical wings, said vertical wings being extended by horizontally bent portions and then vertically bent portions for forming, with the stiffening longitudinal corrugations of the upper mobile profile, an upper guiding path for balls and forming a lower rolling path for rollers placed between: (i) said vertically bent portions of the vertical wings of said lower fixed profile, (ii) corresponding vertically bent wing portions formed on the upper mobile profile, and (iii) guiding elements placed in bottom of the upper mobile profile, whereby said rollers are guided, on a one hand, by said vertically bent wing portions of the upper mobile profile and said guiding elements and, on an other hand, by the lower rolling path formed by the wings of the lower fixed profile so as to ensure a considerable transverse strength and a considerable tearing strength of the upper mobile profile with respect to the lower fixed profile.

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**4,941,638**

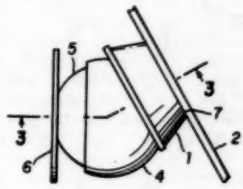
## BLIND SPOT MIRROR

**Albert G. DiSalvatore, 1702 E. 45 St., Ashtabula, Ohio 44004**

**Filed Nov. 25, 1988, Ser. No. 276,130**

**Int. Cl.[5] G02B *5/08***

**U.S. Cl. 248—481** **5 Claims**



1. A blind spot flat mirror having a base mounted on and infixed relation to the inner surface of a windshield, typically on an inside upper corner of the windshield, said base having a seat receiving and fixed to an exterior convex surface of a frustum of a spherical hollow shell of a ball joint to compensate for the inclination of the windshield, a ball rotatably received in said shell for tilting movement through an acute angle relative to the shell in all directions, and a flat seat on said ball fixed to the back surface of a flat mirror.

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**4,941,639**

## REMOTELY CONTROLLED REARVIEW MIRROR FOR MOTOR VEHICLES

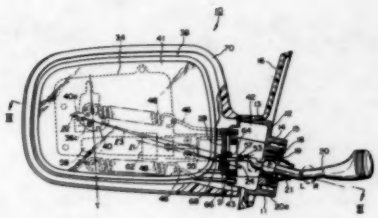
**Masahito Sakao, Saitama, Japan, assignor to Kabushiki Kaisha Matsuyama Seisakusho, Tokyo, Japan**

**Filed May 4, 1988, Ser. No. 190,176**

**Claims priority, application Japan, May 7, 1987, 62-111136**

**Int. Cl.[5] G02B *7/18***

**U.S. Cl. 248—549** **7 Claims**



1. A remotely controlled rearview mirror assembly for use on an automobile which has a longitudinal axis, which axis in nominally horizontal when the automobile is in a nominally horizontal state, comprising:

a mount securable on said automobile in a given orientation relative to nominal vertical and horizontal planes containing said longitudinal axis;

a housing adapted to be secured on said mount;

a mirror swingably supported in said housing;

a control lever swingably secured on said mount for remotely controlling said mirror to move to desired angular positions thereof from within the automobile; and

a link mechanism operatively interconnecting said mirror and said control lever and angularly movable vertically and laterally in response to angular and rotational movement of said control lever for moving said mirror to said desired angular position,

when said mount is secured in said given orientation, said link mechanism being angularly movable vertically about an axis which is inclined upwardly in a lateral direction away from a nominal vertical plane containing said longitudinal axis, and also angularly movable laterally about an axis which lies in a plane including a line substantially normal to said nominal horizontal plane containing said longitudinal axis whereby, when the mirror is moved to change the angle of the mirror relative to a vertical plane, the rear sight appearing on said mirror is not displaced laterally.

4,941,640

## VIBRATION ISOLATING APPARATUS

Ken Nakamura, Tokyo; Toshiaki Onoda, Yokohama, and Yoshihiro Gofuku, Fujisawa, all of Japan, assignors to Tokico Ltd., Kanagawa, Japan

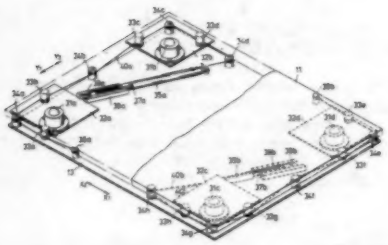
Division of Ser. No. 841,449, Mar. 19, 1986, Pat. No. 4,763,869. This application Feb. 10, 1988, Ser. No. 154,848

Claims priority, application Japan, Mar. 20, 1985, 60-40926[U]; May 20, 1985, 60-74495[U]; Oct. 17, 1985, 60-157871[U]; Nov. 5, 1985, 60-170184[U]

The portion of the term of this patent subsequent to Aug. 16, 2005, has been disclaimed.

Int. Cl.[5] F16M *9/00*

U.S. Cl. 248—562 8 Claims



1. A vibration isolating apparatus comprising:

an upper bed which is adapted to have an object placed thereon;

a lower bed which directly receives an external vibration, said lower bed having a plurality of fixing portions;

support means for supporting said upper bed so that said upper bed is relatively displaceable with respect to said lower bed in a horizontal direction with a small friction;

a plurality of guide members separated from each other and provided on said upper and/or lower beds;

a plurality of wires each arranged in a form of an open loop; and

a plurality of gas springs for absorbing a tension in a corresponding wire depending on a deformation of a shape of the open loop formed by said corresponding wire due to a displacement of said lower bed with respect to said upper bed caused by the external vibration, each gas spring comprising a cylinder portion with one closed end, a gas which is sealed inside said cylinder portion, a guide located at the other end of said cylinder portion, and a rod portion guided by said guide and having one end within said cylinder portion and the other end extending out of the cylinder portion,

each of said plurality of wires being arranged around some guide members of said plurality of guide members so that said each wire passes around a guide member provided on one of said upper and lower beds after another guide member provided on the other of said upper and lower beds, said each wire having one end engaged with a corresponding one of said plurality of fixing portions, and the other end engaged with the rod portion or the cylinder portion of a corresponding gas spring so that a length of said corresponding gas spring is variable.

4,941,641

## VEHICLE SEAT

Manfred Granzow, Dorentrup, and Hans-Peter Mischer, Bad Meinberg, both of Fed. Rep. of Germany, assignors to Gebr. Isringhausen, Bad Meinberg, Fed. Rep. of Germany

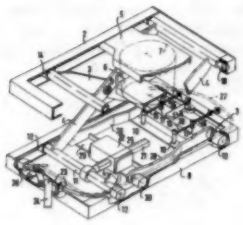
PCT No. PCT/DE88/00292, § 371 Date Mar. 13, 1989, § 102(e) Date Mar. 13, 1989, PCT Pub. No. WO88/09270, PCT Pub. Date Dec. 1, 1988

PCT Filed May 19, 1988, Ser. No. 306,027

Claims priority, application Fed. Rep. of Germany, May 22, 1987, 3717703

Int. Cl.[5] F16M *13/00*

U.S. Cl. 248—588 5 Claims



1. In an air sprung vehicle seat comprising a base frame adapted to be mounted on a vehicle, a seat frame, scissors linkage means including first and second scissors members mounted on said base frame and operative for supporting said seat frame so that the vertical position thereof is adjustable relative to said base frame, air spring means adapted to be connected to a source of pressurized air and responsive to internal air pressure in said air spring means for adjusting the vertical position of said seat frame relative to said base frame, and locking mean actuatable for locking the vertical position of said seat frame relative to said base frame, the improvement comprising said locking means including a fixing element articulated to said scissors means and moving therewith during vertical movement of said seat frame relative to said base frame, said fixing element including a fixing section having a length which is at least as great as the length of the maximum vertical movement of said seat frame relative to said base frame, said locking means further including a fixing device for securing said fixing section in order to secure the relative position of said fixing element in said seat.

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4,941,642

## MOLD CONSTRUCTION COMPRISING A PLURALITY OF MOLD PORTIONS

Kurt Stoll, Lenzhalde 72, 7300 Esslingen, Fed. Rep. of Germany, and Hans H. Glättli, Seestr. 252, CH-Küsnacht, Switzerland

Filed Oct. 4, 1988, Ser. No. 253,263

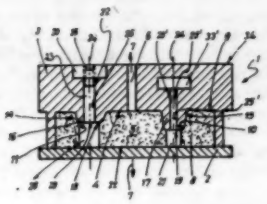
Claims priority, application Fed. Rep. of Germany, Oct. 9, 1987, 3734118

Int. Cl.[5] B29C *39/26*

U.S. Cl. 249—122 16 Claims

1. A mold construction comprising: a first mold portion, and a second mold portion, said first and second mold portions enclosing a mold chamber, at least one of said mold portions being provided with at least one mold core protruding into said chamber, said at least one mold core having an end face, said at least one of said mold portions having at least one recess open to said end face, each of said at least one mold core comprising a shank and an insert, at least one shank being in said at least one recess, said shank having a first end and a second end said at least one mold core with at least part of its end face abutting said at least one mold portion in an abutting region surrounding said at least one recess and fastened to said second end of said shank, said shank being connected to said at

least one mold portion in a way that the at least one mold core is secured against being pulled away in the direction toward



the opposing of said first and second mold portions seen during ejection of a mold part molded in said mold chamber.

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**4,941,643**

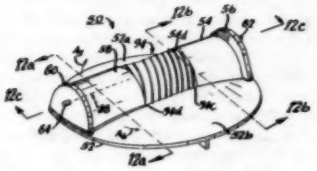
**APPARATUS FOR FORMING INVERTS AND MANHOLE ASSEMBLIES AND THE LIKE UTILIZING ADJUSTABLE INVERT FORMING MEMBERS JOINED WITH AN INTERMEDIATE FLEXIBLE PORTION**

**Jack Ditcher, Tullytown, Pa., assignor to A-LOK Products, Inc., Tullytown, Pa.**

**Filed Jan. 26, 1989, Ser. No. 303,170**

**Int. Cl.[5] B28B** *7/30, 21/88*

**U.S. Cl. 249—145** **13 Claims**



1. Apparatus for forming a channel in a cast member comprising inner and outer cylindrical shaped mold means defining a hollow cylindrical shaped interior region for casting a manhole assembly;

base defining means for forming the base portion of the manhole base and having a substantially annular shaped base member having a curved sloping surface and first and second rigid channel forming means;

said first channel forming means being integrally secured to the curved sloping surface of said base member and arranged along an imaginary radius of said base member and having an inner end adjacent to the center of the base member and an outer end arranged near the periphery of said base member;

said second channel forming means being movable upon said base member and having inner and outer ends;

flexible means arranged between the inner ends of said first and second channel forming means; and

securing means for releasably securing said second channel forming means to said base member adjustably along an arc opposed to the first channel-forming means, whereby said flexible means provides continuous invert channel form from the first channel-forming means the second channel-forming means and an adjustment of an angle formed by said first and second channel-forming means.

**4,941,644**

**VALVE STEM**

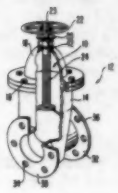
**Richard H. Robinson, Alexander City, Ala., assignor to Robinson Foundry, Inc., Alexander City, Ala.**

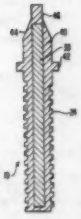
**Division of Ser. No. 337,673, Apr. 13, 1989, Pat. No. 4,916,789.**

**This application Jan. 9, 1990, Ser. No. 462,727**

**Int. Cl.[5] F16K** *3/30*

**U.S. Cl. 251—360** **18 Claims**





1. A valve stem comprising:

an elongated member having an outside surface configured to define the outer surface of a valve stem including a threaded portion and an engagement surface turning portion, said elongated member being formed by an evaporative pattern casting process; and

a rod member cast in said elongated member, said rod member being substantially as long as said elongated member and formed of a different material than that of said elongated member.

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**4,941,645**

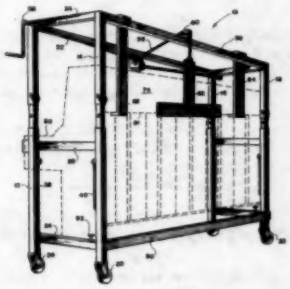
**PIANO LIFTING AND TRANSPORTING APPARATUS**

**Dan M. Hall, 1400 Beverly Garden Dr., Metairie, La. 70002**

**Filed Jul. 11, 1988, Ser. No. 217,311**

**Int. Cl.[5] B60P** *3/00;* **B66C** *1/00*

**U.S. Cl. 254—324** **4 Claims**



1. A device for lifting and transporting a piano comprising:

an inverted U-shaped frame having a substantially rectangular portion and a pair of front and a pair of rear vertical posts;

a wheel means connected to a free lower end of each of said vertical posts;

a hoist means descending from a rear center of said horizontal top portion of the frame;

a T-shaped lifting member connected to said hoist means, having a horizontal portion for engaging a rear horizontal frame post of the piano;

a detachable rear horizontal cross member extending between lower portions of said rear vertical posts and a detachable front horizontal cross member extending between middle portions of said front vertical posts; and

at least one detachable suspension bar adapted for suspension from the top portion of the frame and for engagement with the rear horizontal frame post of the piano a distance from said T-shaped lifting member.

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**4,941,646**

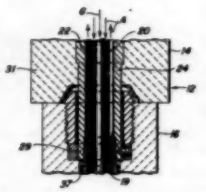
**AIR COOLED GAS INJECTION LANCE**

**Philip D. Stelts, Center Valley; David W. Kern, Slatedale, and Kenneth J. Fioravanti, Allentown, all of Pa., assignors to Bethlehem Steel Corporation, Bethlehem and Air Products & Chemicals, Inc., Allentown, both of, Pa.**

**Filed Nov. 23, 1988, Ser. No. 276,255**

**Int. Cl.[5] C21C *5/32***

**U.S. Cl. 266—270** **3 Claims**



1. A refractory coated lance for introducing a reactive gas into a bath of molten metal the lance comprising:

(a) a first centrally located conduit for conveying a reactive gas extending from a reactive gas supply to the lance tip,

(b) a second centrally located conduit coaxially spaced and surrounding the upper portion of said first centrally located conduit for conveying a stream of gaseous cooling fluid at a high mass flow rate along the outer wall surface of said first conduit,

(c) a third centrally located conduit coaxially spaced and surrounding said first and second centrally located conduits, said third conduit having an outer insulating sleeve under a covering of refractory material and a threaded connection to permit the separation of the upper and lower portions thereof,

(d) a conical gas tight sealing means connecting the lower end of said third centrally conduit to outer periphery of first said centrally located conduit at a point below the discharge end of said second conduit and above the lance tip,

(e) an opening at the upper end of said third centrally located conduit for discharging the high velocity gaseous cooling fluid to the atmosphere.

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**4,941,647**

**PROTECTIVE LINING FOR ALUMINUM REFINING VESSEL**

**John F. Pelton, Yorktown Heights, N.Y., assignor to Union Carbide Corporation, Danbury, Conn.**

**Filed Sep. 12, 1989, Ser. No. 406,277**

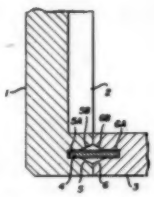
**Int. Cl.[5] C22B *21/06***

**U.S. Cl. 266—285** **6 Claims**

1. In a protective lining for a vessel for the holding, with or without refining, of molten aluminum, comprising a graphite side plate and an end plate adapted to be fitted closely together at a side thereof, said plates being secured together at the lower ends thereof, but being attached at the upper ends thereof to the walls of an outer, externally heated, cast iron tub and capable of being pulled apart, one from the other, at said upper ends thereof upon expansion of the tub during heating of the operating temperature of the vessel, thereby opening a channel for the flow of molten aluminum between the refining space within the vessel and the space between the plates and said cast iron tub, the improvement comprising:

(a) graphite side and end plates having cut-out portions at corresponding portions along the height thereof at the joint between said plates as said plates are fitted closely together, said cut-out portions extending vertically from the top of the plates to the point at which said plates are not pulled apart upon heating;

(b) a refractory sheet member not susceptible to attack by



molten aluminum, said sheet member being positioned across said corresponding cut-out portions of the side and end plates as fitted closely together, said sheet member extending in length vertically in said cut-out portions from above the intended operating level of molten aluminum to below the point at which said plates are pulled part upon heating, the width and thickness of said sheet member being such, relative to said cut-out portions, that, as the plates are pulled apart at the upper ends thereof upon heating of the vessel to operating temperature, the refractory sheet member serves as an effective barrier to the flow of molten aluminum through the channel otherwise created by the pulling apart of said side and end plates, whereby the joint between the side and end plates allows relative motion as required upon heating the vessel to operating temperature, while maintaining an effective barrier to the flow of aluminum between the plates in their pulled-apart position.

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**4,941,648**

**SHOCK ABSORBING DEVICE FOR VEHICULAR SEAT**

**Syuzaburo Kimura, Kanagawa, Japan, assignor to Ikeda Bussan Co., Ltd., Ayase City, Japan**

**Filed May 1, 1989, Ser. No. 345,187**

**Claims priority, application Japan, Jul. 29, 1988, 63-100961[U]**

**Int. Cl.[5] F16F *5/00***

**U.S. Cl. 267—131** **6 Claims**

1. A shock absorbing device for a vehicular seat, comprising:

a link mechanism having lower and upper base members which are movable toward and away from each other; and

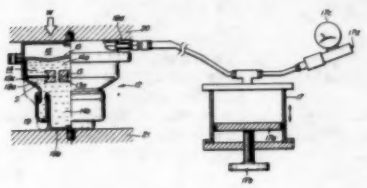
a shock damper interposed between said lower and upper base members to dampen shocks and vibrations applied to the same, said shock damper including:

an axially expandable housing having lower and upper parts which are respectively secured to said lower and upper base members of said link mechanism;

a diaphragm disposed in said housing to partition an interior of said housing into an air-filled part and a liquid-filled part;

a partition wall disposed in said liquid-filled lower part to

partition the same into first and second chambers, said partition wall having an aperture formed therethrough; and



an orifice member axially movably disposed in the aperture of said partition wall, so that said orifice member is selectively projectable into said first and second chambers, said orifice member having an axially extending orifice formed therethrough.

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**4,941,649**

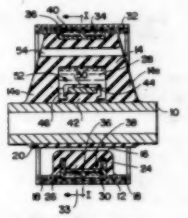
**FLUID-FILLED CYLINDRICAL ELASTIC MOUNT HAVING MEANS FOR IMPROVED DURABILITY OF ELASTIC BODY**

**Yoshiki Funahashi, Iwakura, and Masayuki Hibi, Komaki, both of Japan, assignors to Tokai Rubber Industries, Ltd., Japan**

**Filed Jul. 18, 1988, Ser. No. 220,317**

**Int. Cl.[5] F16F *5/00***

**U.S. Cl. 267—140.1** **10 Claims**



1. A fluid-filled cylindrical elastic mount for flexible coupling of two members, comprising:

an inner sleeve;

an outer sleeve disposed outwardly of said inner sleeve;

an elastic body interposed between said inner and outer sleeves for elastic connection therebetween, said elastic body having a pressure-receiving chamber filled with a non-compressible fluid;

means for defining an equilibrium chamber filled with said non-compressible fluid, said means including an elastic wall;

means for defining a restricted passage for restricted fluid communication between said pressure-receiving chamber and said equilibrium chamber; and

said elastic body having a portion defining a void formed therethrough in an axial direction of said elastic mount, said void and said pressure-receiving chamber being positioned between said inner and outer sleeves, as viewed in a load-receiving direction in which said elastic body is compressed when said elastic mount is attached to said two members, such that said void is positioned between said pressure-receiving chamber and one of said inner and outer sleeves in said load-receiving direction.

**4,941,650**

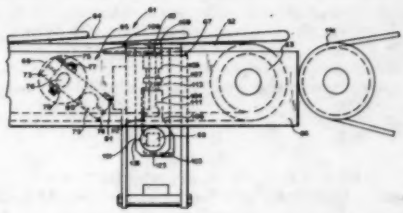
**VACUUM COUNTER FOR STACKED SIGNATURES**

**William Rayback, Rockledge, Fla., assignor to Stacker Machine Co., Inc., Mountainside, N.J.**

**Continuation of Ser. No. 151,006, Feb. 1, 1988, abandoned. This application Jun. 28, 1989, Ser. No. 373,695**

**Int. Cl.[5] B65H *33/04***

**U.S. Cl. 270—95** **7 Claims**



1. An apparatus for forming an indicium in a stream of continuously moving shingled signatures, said indicium consisting of a signature displaced laterally from said stream comprising:

a frame;

a vacuum head shaft mounted in said frame and being laterally movable in said frame;

means for laterally moving said vacuum head shaft; and

at least one vacuum head mounted on said vacuum head shaft below said signatures, said vacuum head having a body and a top, said top having a recessed vacuum chamber, whereby a vacuum is formed in said recessed chamber to hold said signature on said top of said vacuum head and said vacuum head shaft is moved laterally by said means for moving said vacuum head causing said signature indicium to move laterially of said moving signature stream.

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**4,941,651**

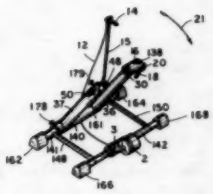
**BICYCLE TRAINER**

**Cal M. Phillips, North Miami Beach, Fla., assignor to RTS Trainer Corporation, Fort Lauderdale, Fla.**

**Filed May 13, 1988, Ser. No. 193,677**

**Int. Cl.[5] A63B *21/00***

**U.S. Cl. 272—73** **14 Claims**



1. A support stand for a bicycle that can be used as a training device, comprising:

(a) a horizontal support having a front and a rear adapted to be placed on a relatively flat surface, wherein said front and said rear are mutually spaceable at varying distances;

(b) first and second upwardly extending mutually spaced legs mounted on said rear;

(c) first and second opposed socket members mounted near an upper extremity of said first and second legs, wherein said socket members are substantially perpendicular to said legs and extendable towards and away from an axle of

a bicycle, said socket members having a socket for capturing an axle of a bicycle;

(d) first and second spacing bars respectively connecting said first and second legs to said front, wherein said spacing bars are pivotally attached to said legs at a point spaced apart from where the legs are mounted on the rear, and wherein the spacing bars are fixedly connected to the front; and

(e) a roller for supporting a bicycle wheel being rotatively mounted on and extending between said first and second spacing bars, wherein said roller is mounted towards said front, whereby any sized bicycle wheel may be mounted in a driving relationship on the roller by adjusting the socket members' height when thrusting the legs forward and rearward varying the distances between the front and the rear.

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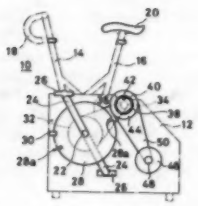
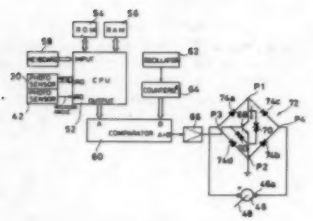
**4,941,652**

## BICYCLE TYPE TRAINING MACHINE

**Masakazu Nagano; Katsuya Nakagawa, and Yoshiaki Nakanishi, all of Kyoto, Japan, assignors to Nintendo Co., Ltd., Kyoto, Japan**

**Filed Feb. 8, 1988, Ser. No. 152,976**
**Claims priority, application Japan, Feb. 9, 1987, 62-028980**
**Int. Cl.[5] A63B** *69/16, 21/00, 23/04*
**U.S. Cl. 272—73** **17 Claims**





**1.** A bicycle type training machine, comprising:

a body;

a pedal crank, rotatably support on said body, having two ends and including pedals attached on to each end;

rotation angle detecting means provided on said body for detecting a rotation angle of said pedal crank;

data generating means, responsive to said detecting means, for generating desired load data;

a reference clock signal generation for generating a reference clock signal;

counter means which receives said reference clock signal;

comparing means which compares said desired load data from said data generating means with a counted value of said counter means; and

electrical braking means, linked to said pedal crank and responsive to said comparing means, for generating a braking force, wherein said electrical, braking means includes pulse generating means for generating a pulse having a duty ratio, said duty ratio comprising relative time periods of a first level and a second level of a pulse in accordance with said desired load data.

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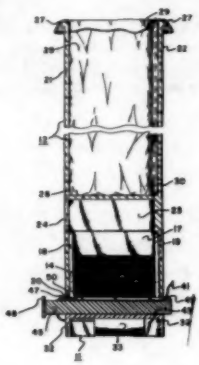
**4,941,653**

## COMBINATION NEWSPAPER AND TRASH RECEPTACLE

**James G. Sterner, Jr., R.R. 4, Box 60, Sewell, N.J. 08080**

**Filed Jul. 7, 1989, Ser. No. 376,983**
**Int. Cl.[5] B65D** *85/62*
**U.S. Cl. 220—1 T** **9 Claims**



**1.** A combination trash receptacle for storing newspapers and other trash separately comprising:

a lower newspaper receptacle having a receptacle base, a floor superimposed thereupon of length and breadth of that of a common newspaper and having upwardly extending front, rear and opposed side walls;

an upper trash receptacle having front, rear and opposed side walls dimensioned to nest with the upwardly extending front, rear and opposed side walls of the lower newspaper receptacle; and

a floor within the upper trash receptacle whereby newspapers may be stored within the lower newspaper receptacle and other trash within the upper trash receptacle prior to disposal.

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**4,941,654**

## METHOD AND APPARATUS FOR STACKING APERTURED SHEETS WITHOUT JAMMING

**Gary L. Kelley, Milford, Mass., assignor to Dennison Manufacturing Company, Framingham, Mass.**

**Filed Jun. 29, 1985, Ser. No. 760,010**
**Int. Cl.[5] B65H** *31/00*
**U.S. Cl. 271—209** **6 Claims**

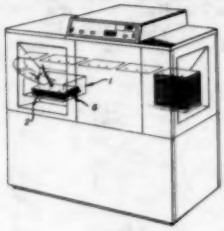
**1.** A sheet stacker comprising:

a. a sheet receptor station for accumulating a stack of sheets;

b. sheet feed means for feeding each sheet in a given feed direction toward said stacking station, said stacking station further including a base;

c. arch forming means for supporting said stack only at a plurality of centralized portions thereof for permitting edge portions thereof to be pulled downwardly toward said base by gravity to form an arch in said stack transverse to said direction of feed, together with movable

sheet support means, coupled between said base and said arch forming means, for permitting said sheets to be low-



ered toward said base as the weight of the stack of sheets over said arch forming means increases.

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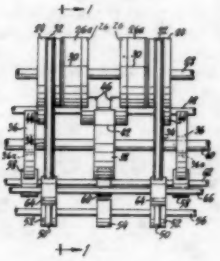
**4,941,655**

**SKEW-CORRECTING AND DELAY MECHANISM FOR SHEET FEEDER**

**Theodore Winkler, Levittown, Pa., assignor to Brandt, Inc., Bensalem, Pa.**

**Filed Nov. 15, 1988, Ser. No. 271,914**
**Int. Cl.[5] B65H *9/00***
**U.S. Cl. 271—242** **6 Claims**



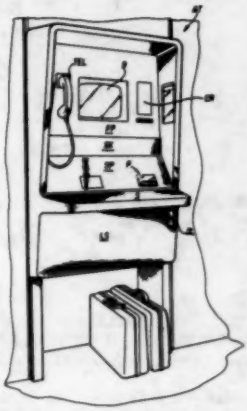
1. Skew-correcting apparatus including in combination first and second sets of opposing feed rollers, said first set comprising a pair of first end rollers and a first center roller between said first end rollers, said second set comprising a pair of second end rollers and a second center roller between said second end rollers, said first center roller having a sheet-gripping portion of limited circumferential extent forming a nip with said second center roller, said first end rollers respectively engaging said second end rollers, means for coupling said second set of rollers for concomitant rotation, means for mounting said first end rollers for rotation relative to said first center roller, means for driving said first center roller, and means for retarding the rotation of rollers other than said first center roller, whereby said other rollers are normally stationary to align the leading edge of a sheet but are driven by said sheet-gripping portion of said first center roller to advance said sheet through said nip.

**4,941,656**

**SHEET HANDLING MECHANISM**

**Michael L. Davies, American Fork, and Lawrence Weber, Centerville, both of Utah, assignors to Unisys Corp., Detroit, Mich.**

**Filed Dec. 8, 1986, Ser. No. 939,514**
**Int. Cl.[5] B65H *31/00***
**U.S. Cl. 271—278** **24 Claims**



1. A machine for automatically preparing and dispensing unit records to a subject person; this machine including:

record preparation means adapted to print and prepare one or several unit records in a set, responsive to prescribed preparation commands, and to further eject the records serially to a preparation-output station; said machine being secured against unauthorized access and arranged to allow operator access by opening of a predetermined delivery port only upon prescribed access signals; plus record printing means and;

moveable unit-record receiving means normally disposed operatively adjacent said preparation-output station and adapted to receive printed records, there, from said preparation mean and to be moved to present these records to be accessible to the subject person from said delivery port, said record receiving means also being selectively operable to automatically dump its contents into associated discard-record storage means upon occurrence of any of the several prescribed anomalous conditions.

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**4,941,657**

**SHEET SORTING DEVICE**

**Tadayuki Kitajima, Yokohama; Toshiyuki Asakawa, Sagamihara; Masataka Naito, Yokohama; Kazuhiro Matsuo, and Toshiaki Murayama, both of Tokyo, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 195,092, May 17, 1988, abandoned, which is a division of Ser. No. 838,826, Mar. 12, 1986, Pat. No. 4,854,571. This application Nov. 13, 1989, Ser. No. 436,091**
**Int. Cl.[5] B65H *39/10***
**U.S. Cl. 271—293** **8 Claims**

1. A sheet sorting device for sorting sheets conveyed onto multi-stage bin trays, comprising:

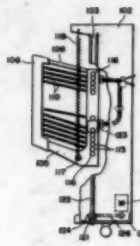
a plurality of bin trays provided in multiple stages;

a support member supporting said bin trays and vertically movable;

drive means for moving said support member and the fore end of each bin tray for receiving sheets as well as the end of each bin tray remote there from up and down; and

a spring member for suspending said support member from

the sheet sorting device and receiving substantially the combined load of said support member and said bin trays



to offset said combined load which otherwise would be applied to said drive means.

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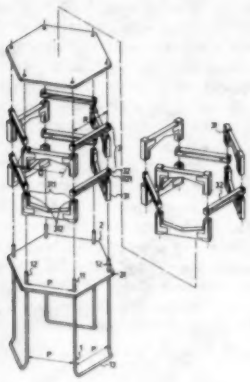
**4,941,658**

## FABRICATED AMUSEMENT PLATFORM

**Kent Poo, Taipei, Taiwan, assignor to Omni World, Inc., Taipei, Taiwan**

**Filed Jun. 6, 1989, Ser. No. 362,140**
**Int. Cl.[5] A63B *17/00***
**U.S. Cl. 272—56.5 R** **3 Claims**



1. A fabricated platform comprising:

a plurality of skeleton members having at least one pair of columns adapted to be disposed vertically on a mounting surface;

a plurality of block members each having a pair of throughholes adapted to be simultaneously passed through by a pair of columns of one of said skeleton members; and

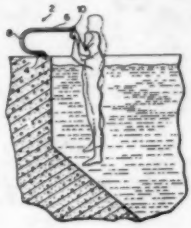
at least one first plate member having a plurality of pairs of holes formed therethrough, the two holes in each pair being spaced apart from each other at a distance which equals the distance between said two columns of one of said skeleton members; whereby said platform is fabricated by passing said columns of said skeleton members through said throughholes of said block members and said holes of said first plate member in order to vertically stack said block members and stably support said first plate member which is suspended among said columns of said skeleton members.

**4,941,659**

## AQUATIC EXERCISER

**Claudio Silvestri, 2825 Islington Avenue, Suite 410, Weston, Ontario, Canada (M9L 2K1)**

**Filed Jan. 31, 1989, Ser. No. 304,246**
**Int. Cl.[5] A63B *1/00***
**U.S. Cl. 272—62** **9 Claims**



1. An exerciser comprising a mounting base having a base plate with a plurality of apertures therein by means of which said base plate is securable adjacent a support edge having a level of water in a forward direction, therebeyond;

an extension member having a lower arm extending rearwardly from said base, into a 'U' shaped section which curves upward and back over itself into an upper arm which extends cantilevered, over said lower arm in said forward direction, to a point beyond said base plate;

said 'U' shaped section of said extension member being located to one side of said mounting base with said upper arm having its free end terminating at a position located to the opposite side of said mounting base;

said upper arm supporting a user engaging member at its free end.

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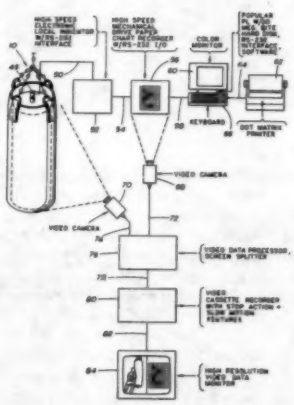
**4,941,660**

## IMPACT AND SPEED MEASURING SYSTEM

**Donald G. Winn, and Daniel M. Josephson, both of 6710 Escondido Dr., Houston, Tex. 77083**

**Filed Sep. 2, 1988, Ser. No. 239,986**
**Int. Cl.[5] A63B *69/00***
**U.S. Cl. 272—76** **1 Claim**




1. A system for measuring and recording total applied force instead of only peak force associated with martial and boxing arts, said system including in combination

bag means vertically supported at the upper end and including a transducer,
interface means connected to said transducer,
recorder means providing a recording and connected to said interface means,
computer means including program means connected to said recorder means, said computer means being comprised of standard components not requiring customizing,
dot matrix printer means connected to said computer means for providing the compared results from the computer means, wherein said results including the total applied force instead of only the peak force for an entire training session, number of strikes, force of each strike, average force per strike, average strikes per minute, maximum and minimum force strikes and when such strikes occurred, fastest and slowest time between two strikes, and the time when the average force per strike starts to decline rapidly to indicate fatigue of the muscles used to strike said bag means so that progress of training may be ascertained,
first and second video cameras, said first video camera being focused on said bag means and said second video camera being focused on said recorder means,
video data processor means connected to said first and second video cameras,
video cassette recorder means connected to said video data processor means, and
video data monitor means connected to said video cassette recorder means whereby said bag means and the person applying a plurality of intermittent strikes to said bag means is displayed in synchronization alongside the total applied force from each of said plurality of intermittent strikes.

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**4,941,661**
**ADJUSTABLE BASKETBALL BACKBOARD APPARATUS**
**Gregory S. Lykens, 1409 Kingswood Dr., Fulton, Mo. 65251**
**Filed Feb. 13, 1989, Ser. No. 309,484**
**Int. Cl.[5] A63B *63/08***
**U.S. Cl. 273—15 R** **10 Claims**

1. An adjustable basketball backboard apparatus for securement to a support standard for varying the height of the apparatus relative to the standard, the apparatus comprising,
a basketball net member orthogonally secured to a forward face of a vertically oriented backboard,
and a first and second support arm secured their forward ends to a rearward face of the backboard and extending rearwardly of the backboard with rearward ends of the support arms extending interiorly of a support housing, said support housing including a rotatably mounted support rod coextensive with said support housing including a lowermost torguing means to effect rotation of the support rod,
and a support means to securedly receive the rearward ends of the support arms and vertically adjustable relative to the support rod upon rotation of the support rod relative to the support means by application of force to the torguing means.

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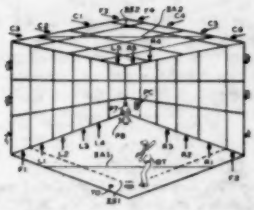
**4,941,662**
**BASEBALL GAME**
**James DePersa, P.O. Box 665, Landing, N.J. 07850**
**Filed Nov. 14, 1988, Ser. No. 270,091**
**Int. Cl.[5] A63C *69/00***
**U.S. Cl. 273—25** **16 Claims**



1. An apparatus for playing a baseball game played on a playfield having a ball pitching position and a batting position placed therein, comprising
a ball detection means located in a ball passage zone between said pitching position and said batting position for providing a ball passage signal in response to passage of said ball through a ball passage zone:
a plurality of field zones placed about the perimeter of said playfield, each said field zone having ball intercept detecting means positioned for intercepting a ball and providing in response to said interception a signal indicating the position of a ball entering said zone, said signal corresponding to a position indicating a hit, foul or out; and
scoring means coupled to said intercept detecting means for registering a hit, foul or out in response to said, said scoring means including:
iming means for indicating the elapsed time between a ball passing through said ball passage zone and interception of a ball by said ball intercept detecting means to provide a speed signal, said scoring means being operable to indicate a score in response to said speed signal.

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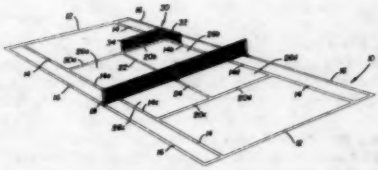
**4,941,663**
**TENNIS SERVICE CATCHING NET**
**MacQuarrie Walker, 25 Nortontown Rd., Madison, Conn. 06433**
**Filed Apr. 26, 1989, Ser. No. 343,502**
**Int. Cl.[5] A63B *69/00***
**U.S. Cl. 273—29 A** **16 Claims**



1. A service practice court for tennis comprising:
a tennis net; a regulation service area having rear and outside service lines on one side of said tennis net; a regulation

base line on the other side of said tennis net; and a service catching device comprising

a first frame section having vertical members defining the ends of said first section and at least one horizontal member connecting said vertical members,

said first frame section having a horizontal length substantially the same as that of, and disposed along, the rear line of an individual regulation tennis court service area;

a second frame section, adjacent to said first frame section, having vertical members defining the ends of said second section and at least one horizontal member connecting said vertical members, said second frame section having a horizontal length less that of said first frame section and disposed along a portion of the outside line of said service area, said first and second frame sections being secured perpendicular to each other along a common vertical edge and having opposite free ends to form an "L" shape as seen in plan view; and

a sheet material secured within each of said frame sections to restrict passage of a tennis ball,

said frame sections and associated sheet material adapted to retain tennis balls served into said service area from the opposite side of said tennis court.

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**4,941,664**

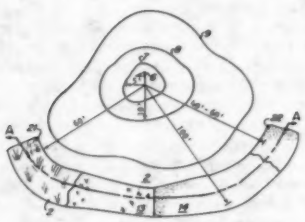
**GOLF SHOT DUPLICATOR**

**Dwight W. Pate, 101 Mirada Rd., Half Moon Bay, Calif. 94019**

**Filed Jan. 30, 1989, Ser. No. 302,926**

**Int. Cl.[5] A63B *69/36, 67/02***

**U.S. Cl. 273—35 B** **2 Claims**



1. A course for duplicating golf shots comprising:

a target area including a plurality of targets at spaced locations therein; and a teeing loop disposed substantially about said target area, the teeing loop including a plurality of teeing locations at spaced apart positions therealong for playing selected ones of said plurality of targets, said teeing location having golf balls teeing surfaces including tall grass, short grass, sand and hardpan dirt, with such surfaces disposed at various elevations and degrees of level, up-sloping, down-sloping side-sloping terrain.

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**4,941,665**

**ROTATOR GAME DEVICE**

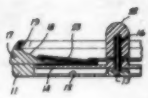
**Reuben B. Klamer, 828 Prospect St., La Jolla, Calif. 92037**

**Filed Jan. 25, 1989, Ser. No. 301,816**

**Int. Cl.[5] A63F *5/04***

**U.S. Cl. 273—142 H** **12 Claims**

1. A rotator game device for the generation of randomly selected data comprising a housing, a base member rotatable within said housing and having a plurality of centrally located detents or collars, a retainer member at the top of said housing overlying part of said base member without contacting the same and having a circular inclined surface and retaining lip, and a plurality of removable wheels carrying indicia and having one edge supported on the base member and the other edge supported on the inclined surface of said retainer member in a spaced relationship from said retaining lip, such that when the base member is at rest the wheels are nested under the influence of gravity in the detents of the base member, and when the base member is rotating the wheels are displaced outwardly and up the inclined surface of the retainer member to contact the retaining lip under the influence of centrifugal force, resulting in the wheels revolving in the direction of



movement of said base member with respect to said housing and said retainer member while individually counter rotating until centrifugal force decreases to the point where they fall under the influence of gravity back to the detents in the base member.

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**4,941,666**

**GOLF CLUB, SET OF GOLF CLUBS, AND METHOD OF PRODUCING THE SAME**

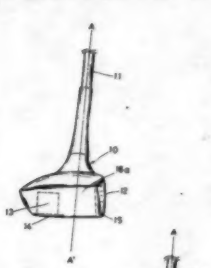
**Noriyuki Suganuma, 2-9-17, Nagata-Minami, Minami-ku, Yokohama-shi, Kanagawa-ken, Japan**

**Filed Aug. 18, 1987, Ser. No. 86,549**

**Claims priority, application Japan, Aug. 27, 1986, 61-198945; Aug. 27, 1986, 61-198946**

**Int. Cl.[5] A63B *53/04***

**U.S. Cl. 273—169** **9 Claims**



1. A golf club which is used for so-called through-the green shots from a tee shot to a shot causing a ball to be on a putting green, wherein said golf club comprises a club head (**10**) having a striking face defined in part by a leading edge, and a shaft (**11**) extending from said club head, said club head having a center of mass (**16*a*, 16*b***) substantially located in a front portion in a static state of said golf club with respect to a central plane

(A—A') which passes longitudinally through the center of said shaft substantially parallel to said leading edge (11) and divides said club head into said front portion containing said striking face and a rear portion.

6. A method of producing a set of golf clubs which is constituted by a plurality of different golf clubs, each of the golf clubs in said set comprising at least a club head (10) having a striking face defined in part by a leading edge and a shaft (11) extending from said club head, and the steps of forming a club head structure such that a position of a center of mass (16a, 16b) of said club head is substantially located in a front portion at the striking face side of said club head in a static state of said golf club with respect to a central plane (A—A') which passes longitudinally through the center of said shaft substantially parallel to said leading edge (11) and divides said club head into said front portion containing said striking face and a rear portion, and assembling said plurality of different club heads by mounting each said club head structure onto an end of one of said plurality of shafts.

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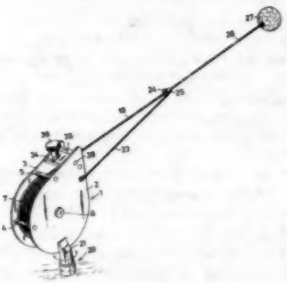
## 4,941,667
## GOLF PRACTICING APPARATUS

Thomas Wiklund, Trangsund, Sweden, assignor to Golf Comback AB, Viklung, Sweden

PCT No. PCT/SE88/00492, § 371 Date Jun. 9, 1989, § 102(e) Date Jun. 9, 1989, PCT Pub. No. WO89/04699, PCT Pub. Date Jun. 1, 1989
PCT Filed Sep. 23, 1988, Ser. No. 375,028
Claims priority, application Sweden, Nov. 27, 1987, 8704732
Int. Cl.[5] A63B 69/36
U.S. Cl. 273—185 C 5 Claims

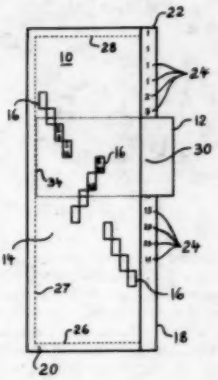


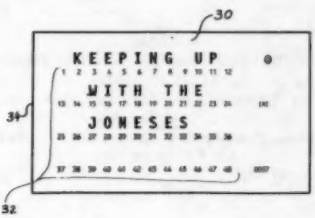
1. Golf practising apparatus comprising a housing (1) having rotatably mounted therein a capstan (7) for taking up and paying out a line (19, 26) which is firmly connected to the capstan and which has a golf ball (27) connected to the free end thereof, characterized in that the housing is provided with a ground anchoring device (20) which permits the housing (1) to be rotated about a substantially vertical axis; in that extending outwardly from the housing is an elongated, resilient line guide (23) having provided on the end thereof remote from the housing a guide device (24) which freely embraces the line; in that the line comprises a first, outer highly stretchable elastic line part (26) and a second line part (19) of low stretchability and connected to the capstan; and in that attached between the first and the second line parts is a stop device (25) which is intended to co-act with the guide device (24) when line is wound onto the capstan in a manner to prevent the first line part (26) from being wound onto the capstan (7); and in that a brake means (16) is configured to exert on the capstan (7) a braking force which increases with increasing lengths of line paid out from the capstan.

## 4,941,668
## WORD PUZZLE CARD GAME

Matthew M. Mobrem, 3203 Nuttree Woods Dr., Midlothian, Va. 23112

Filed Aug. 4, 1989, Ser. No. 389,858
Int. Cl.[5] A63F 3/00
U.S. Cl. 273—248 9 Claims




1. A word puzzle card game comprising:

means for selectively revealing and disclosing characters of words, said means for selective revealing and disclosing including:

a plurality of puzzle cards each having imprinted upon a surface thereof a word or phrase to be determined; and,

at least one template mask device having masking means for concealing portions of said surface while one of said plurality of puzzle cards is displaceably disposed behind said masking means in any one of a plurality of displacement positions, said making means having windows for selectively revealing said characters while said surface is partially concealed by said masking means,

each of said plurality of puzzle cards being displaceable to said plurality of displacement positions with respect to said masking means to selectively reveal different said characters of said word or phrase; and,

wherein said characters are located within cells of an identical matrix on each of said plurality of puzzle cards, said cells being arranged in rows and columns, each of said cells bearing a unique indicium, said indicium corresponding to the position of said each of said cells within said matrix, and wherein said windows selectively reveal said cells including said character or characters and said unique indicium located therein.

**4,941,669**

## FIBER-REINFORCED PISTON RING FOR INTERNAL COMBUSTION ENGINE

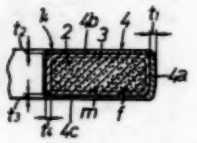
**Yoshikazu Fujisawa; Tsunehisa Hata, and Tadayoshi Hayashi, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 23, 1989, Ser. No. 315,398**

**Claims priority, application Japan, Jan. 24, 1988, 63-41393; Jan. 24, 1988, 63-41394**

**Int. Cl.[5] F16J** *9/20, 9/22*

**U.S. Cl. 277—235 R** **8 Claims**



2. A fiber-reinforced piston ring for an internal combustion engine, comprising a main annular composite body formed of a reinforcing fiber of long carbon fibers oriented in a circumferential direction of the piston ring in a matrix of an aluminum alloy and having a fiber volume fraction in a range of 5% to 60%, a single-material layer formed of an aluminum alloy and covering the surface of said main composite body, and a hard layer covering the entire surface of said single-material layer, wherein said hard layer is provided with a greater thickness on a surface portion of the piston ring that slidably engages the cylinder wall of the engine than the thickness on the remaining surfaces.

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**4,941,670**

## RIDE-ON DEVICE FOR TRANSPORTATION AND STUNT RIDING

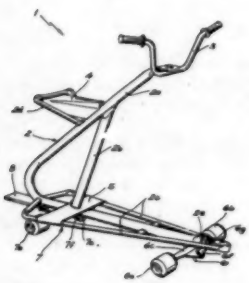
**David A. Parr, 1 Nattai Close, Thornleigh NSW, Australia**

**Filed Sep. 9, 1988, Ser. No. 242,396**

**Claims priority, application Australia, Sep. 10, 1987, PI4318**

**Int. Cl.[5] B62D** *7/00*

**U.S. Cl. 280—87.021** **11 Claims**



1. A transportation and stunt riding device adapted for use on a supporting surface comprising:

a V-shaped frame having a first arm and a second arm and a longitudinal axis, said first arm and said second arm being fixed with respect to each other;

upper and lower body stabilization and support means mounted on said frame;

at least two wheel mounting means mounted to said frame and having at least four wheels rotatably attached to said at least two wheel mounting means adapted to be powered by at least one of potential and kinetic energy, the direction of travel of said device being governed by the non-perpendicular positioning of the frames relative to the supporting surface;

wherein one of said wheel mounting means includes front wheel mounting means defined by a first plate pivotally connected to the second arm of the V-shaped member by a stub axle integrally mounted on the first plate and passing through sleeve attached to the second arm of the V-shaped member, at least one wheel engaging axle permanently affixed to said first plate.

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**4,941,671**

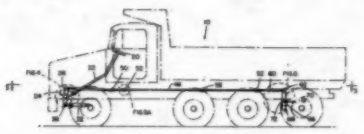
## FOUR-WHEEL STEERABLE VEHICLE HAVING A FORE/AFT SLIDING LINK

**Svein Ellingsen, Bothell, Wash., assignor to Paccar Inc., Bellevue, Wash.**

**Filed Mar. 31, 1989, Ser. No. 331,459**

**Int. Cl.[5] B62D** *61/10*

**U.S. Cl. 280—91** **22 Claims**



1. An apparatus providing controlled steering of four wheels on a vehicle, two of said wheels being front axle wheels coupled to a front axle and two of said wheels being rear axle wheels coupled to a rear axle, comprising:

a steering shaft rotatably coupled to a frame of said vehicle, said steering shaft having a steering wheel means coupled thereto for rotation by a driver to steer said vehicle;

a steering gear coupled to said steering shaft and to said frame of said vehicle;

an arm coupled to said steering gear, said arm pivoting about a point when said steering shaft rotates;

a first drag link having a first end pivotally coupled to said arm and a second end pivotally coupled to a front-wheel steering control arm, said front-wheel steering control arm coupled to said front axle wheels;

a second drag link having a first end pivotally coupled to said arm;

a sliding link extending from a position adjacent said front axle to a position adjacent said rear axle, said second drag link being pivotally coupled to said sliding link;

a third drag link having a first end pivotally coupled to a second end of said sliding link and a second end pivotally coupled to an idler arm, said idler arm being coupled at an idler arm pivot point to said frame at a position adjacent said rear axle; and

a fourth drag link having a first end pivotally coupled to said idler arm and a second end pivotally coupled to a rear-wheel steering control arm, said rear-wheel steering control arm coupled to said rear axle wheels.

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**4,941,672**

## REAR WHEEL STEERING DRIVE MECHANISM

**Lawrence J. Godin, West Bloomfield, Mich., assignor to Chrysler Corporation, Highland Park, Mich.**

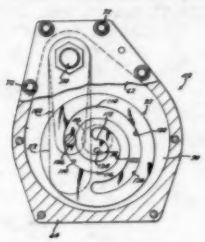
**Filed May 8, 1989, Ser. No. 348,436**

**Int. Cl.[5] B62D** *7/15*

**U.S. Cl. 280—91** **5 Claims**

1. A rear wheel steering drive mechanism for a vehicle having a front wheel steering system and a rear wheel steering system, the rear wheel steering drive mechanism comprising a casing, an input shaft and an output shaft journaled in the casing, the input shaft adapted to be operatively connected to the front wheel steering system for rotation thereby whenever the front wheel steering system is activated, the output shaft

adapted to be operatively connected to the rear wheel steering system to selectively transmit front wheel steering system activity to the rear wheel steering system, a cam member positioned within the casing and connected to the input shaft for rotation therewith, the cam member having a spiral cam groove, a cam arm connected to the output shaft for rotation therewith, a cam pin extending from the cam arm into the cam groove, the cam groove having a central circular first cam portion the center of which is coincident with the axis of rotation of the cam member, the cam pin being positioned at substantially the midpoint of the first cam portion when the vehicle front wheel steering system is in the straight ahead mode whereby initial actuation of the front wheel steering system with concomitant turning of the input shaft and cam



member is ineffective to cause movement of the cam arm so long as the cam pin is positioned within the first cam portion, the cam groove having a second cam portion spiralling radially outwardly from one end of the first cam portion and a third cam portion spiralling radially inwardly from the other end of the first cam portion, said second and third cam portions being circular and having a common center differing in location from that of the first cam portion, continued actuation of the front wheel steering system ultimately rotating the input shaft and cam member to a position where the cam pin enters one of the second or third cam portions depending upon the direction of front wheel steering with resultant pivoting of the cam arm and rotation of the output shaft and actuation of the rear wheel steering system.

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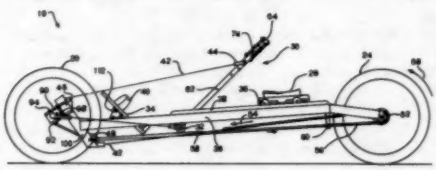
**4,941,673**

## EXERCISE DEVICE

**Sam H. Bennett, 4930 S. 5th St. W., Idaho Falls, Id. 83401**

**Filed Feb. 13, 1989, Ser. No. 309,216**
**Int. Cl.[5] B62M *1/12*; B62D *9/02***
**U.S. Cl. 280—112.2** **14 Claims**



1. An exercise apparatus comprising:
a. a frame member having a front-to-back longitudinal axis;
b. at least three wheels affixed to the frame;
c. a rowing post moveably affixed to the frame and providing locomotion to the wheels when moved in a first plane aligned along the longitudinal axis;
d. steering handles affixed to the rowing post and adapted to pivot in a second plane which includes the rowing post and at an angle to the longitudinal axis; and
e. means to cant the frame when the apparatus is turned, comprising a forwardly and downwardly angled inclined plane having a front axle pivoted thereon such that movement of the axle upon the inclined plane causes canting of the frame.

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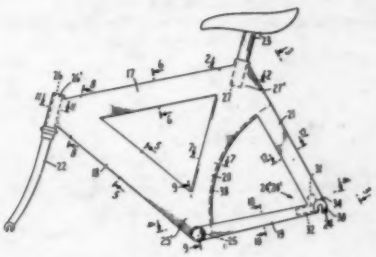
**4,941,674**

## TUBULAR BICYCLE FRAME

**Brent J. Trimble, 8025 Sundi Way, Anchorage, Ak. 99502**

**Continuation of Ser. No. 861,983, May 12, 1986, abandoned.**
**This application Jan. 29, 1988, Ser. No. 149,984**
**The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.**
**Int. Cl.[5] B62K *3/02*, *19/02***
**U.S. Cl. 280—281.1** **34 Claims**



1. A bicycle frame having a steering support means for rotatably supporting a front fork assembly for carrying handle bars and a front wheel assembly, a seat support means for supporting a seat assembly, a pedal support means for supporting a pedal crank and chain wheel assembly, and a rear wheel support means for supporting a rear wheel assembly, said frame comprising:
a hollow tubular top portion connecting and extending between said steering support means and said seat support means;
a hollow tubular down tube portion connecting and extending between said steering support means and said pedal support means;
a hollow tubular seat column portion connecting and extending between said seat support means and said pedal support means;
a pair of hollow chain stay portions connecting and extending between said pedal support means and said rear wheel support means; and,
a pair of hollow seat stay portions connecting and extending between said seat support means and said rear wheel support means;
said top portion, said down portion and said seat column portion forming an open front triangle,
said seat column portion, said chain stay portions and said seat stay portions forming an open rear triangle with one of said chain stay portions and a corresponding one of said seat stay portions on either side of said rear wheel assembly,
said seat column portion providing a hollow common portion of said front and rear triangles and the outer edges of the other sides of said front triangle and the other two sides of said rear triangle substantially defining an outline of the geometry of said frame as viewed from one side thereof,
said tubular portions being integrally united to form a hollow tubular bicycle frame having a unitary construction with two generally triangular shapes defined by said hollow portions and with said hollow common portion forming a side of each of said generally triangular shapes, said unitary construction being a continuous hollow shell without abutting joints;
and the members forming said rear triangle being integrally united to form a unitary frame portion having a hollow common junction between said seat column member and

said pair of chain stay members, a hollow common junction between said seat column member and said pair of seat stay members, and a pair of hollow common rear junctions one on either side of said rear wheel assembly between a corresponding one of said pair of chain stay members and a corresponding one of said pair of seat stay members.

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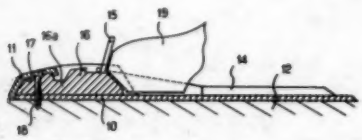
4,941,675

## CROSS COUNTRY SKI LINKAGE APPARATUS INCLUDING PRE-STRESSED BLADE

Marc Provence, Annecy, France, assignor to Salomon S.A., Annecy, France

Filed Nov. 5, 1986, Ser. No. 927,117
Claims priority, application France, Nov. 26, 1985, 85 17444
Int. Cl.[5] A63C 9/00
U.S. Cl. 280—615 26 Claims



25. A ski boot and linkage apparatus for cross country skiing comprising:

a ski boot, said ski boot having an upper portion for receiving a foot and having a front end and a sole;

an elastic elongate element for associating the upper side of a ski with said boot for permitting the heel of said boot to lift therefrom by flexing of said elastic element; and

an upper support surface on said ski;

wherein said elastic elongate element and said upper support surface have configurations for deforming and creating a pre-stressed moment of said elastic elongate element when it is associated with said upper support surface for urging said elastic elongate element toward said ski, and

wherein said elastic elongate element extends from said front end and adapted to connect said ski boot to said ski, said elastic elongate element further comprising a forward lower surface area and a rearward surface area which slope with respect to each other to meet at an intersection below a flexion zone of said elastic elongate element.

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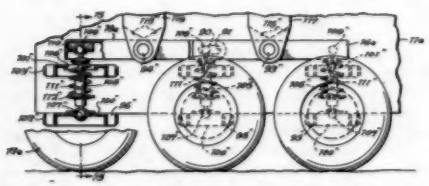
4,941,676

## ALL-TERRAIN VEHICLE

John F. Kopczynski, 1671 Sweeney St., North Tonawanda, N.Y. 14120

Division of Ser. No. 319,127, Mar. 3, 1989. This application Oct. 25, 1989, Ser. No. 426,428
Int. Cl.[5] B60G 5/00
U.S. Cl. 280—685 13 Claims



1. A vehicle comprising a vehicle body, first and second bogies, first and second longitudinally spaced axles on said vehicle body mounting central portions of each of said first and second bogies, respectively, for pivotal movement, each of said bogies having inner and outer ends, first spring-shock strut means mounting an outer wheel for rotation relative to each outer end of each of said first and second bogies, second spring-shock strut means mounting an inner wheel on the inner end of said second bogie, and linkage means coupling said inner ends of said first and second bogies for causing said first and second bogies on said vehicle to pivot in unison about said first and second axles, respectively.

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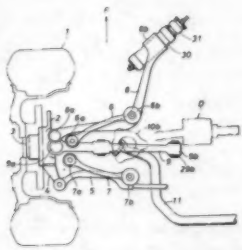
4,941,677

## INDEPENDENT WHEEL SUSPENSION SYSTEM

Yoshiyuki Matsumoto, and Kanji Kubo, both of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Aug. 9, 1988, Ser. No. 230,081
Claims priority, application Japan, Aug. 10, 1987, 62-199513; Aug. 10, 1987, 62-199514; Aug. 10, 1987, 62-199515; Aug. 10, 1987, 62-122270[U]; Aug. 10, 1987, 62-122271[U]; Sep. 4, 1987, 62-221380
Int. Cl.[5] B60G 3/18
U.S. Cl. 280—690 16 Claims



1. A wheel suspension system comprising:

a wheel carrier, rotatably supporting a wheel, said wheel carrier having an upper part and a lower part which are coupled to a vehicle body by way of an upper lateral link means and a lower lateral link means, respectively,

said upper lateral link means includes a pair of upper lateral link members, arranged one behind the other, having inner ends of said upper lateral link members pivotally attached to said vehicle body at a substantially same elevation and having outer ends pivotally attached to said wheel carrier at mutually different elevations.

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4,941,678

## LIGHTWEIGHT REACTION CAN FOR PASSENGER INFLATORS

Donald R. Lauritzen, Hyrum, Utah; Michael J. Ward, Howell, Mich., and Scott R. Anderson, Syracuse, Utah, assignors to Morton Thiokol, Inc., Chicago, Ill.

Filed Jun. 29, 1989, Ser. No. 373,318
Int. Cl.[5] B60R 21/12
U.S. Cl. 280—732 8 Claims

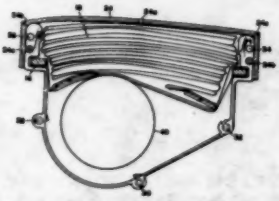
1. A lightweight reaction can for vehicle passenger inflators comprising,

a trough-shaped body part having opposite ends, opposite side walls, and a bottom wall with an inflatable bag ring retaining notch on the inner side of each side wall, said body part further having inflatable bag cover retaining grooves on the outer side of each side wall, and a plurality of end plate attachment grooves on each opposite end,

first and second end plates attached to a respectively associated opposite end of said body part by means positioned in cooperative relation with the respective end plate attachment grooves,

each of said first and second end plates acting to retain the shape of said body part and having a shoulder facing inwardly of said body part and positioned to be in substan-

tial alignment with the inflatable bag retaining notches on the inside walls thereof, each of said first and second end plates further having a reaction can attachment flange and a gas generator flange seat positioned to receive and to support an associated one of the ends of an elongated inflator gas generator positioned therein, and



a cover for the reaction can to protect an inflator inflatable bag positioned therein, said cover being retained on said reaction can by said inflatable bag cover retaining grooves on the outer side of each side wall of said body part.

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**4,941,679**

## AXIALLY ADJUSTABLE STEERING DEVICE FOR MOTOR VEHICLES

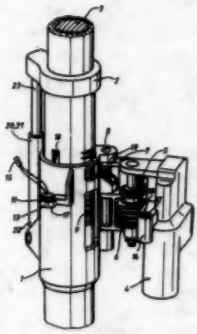
**Karl-Heinz Baumann, Bondorf; Herbert Holtze, Weil der Stadt; Martin Wünsche, Bad Schwalbach, and Wolfgang Schwede, Sindelfingen, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed Jun. 27, 1989, Ser. No. 371,753**

**Claims priority, application Fed. Rep. of Germany, Jul. 2, 1988, 3822460**

**Int. Cl.[5] B62D *1/18***

**U.S. Cl. 280—775** **7 Claims**



1. Axially adjustable steering device for motor vehicles, which comprises two jacket-tube parts of which an outer jacket-tube part is secured to the body and an inner jacket-tube part, in which a steering shaft is fixed axially, is displaceable telescopically in the outer jacket-tube part by means of a controllable drive, a driven worm gear mounted in a reception part engaging into a tooth-profile part extending axially on the displaceable inner jacket-tube part and acting on the latter in a longitudinally displacing manner, a reception part of the worm gear being pivotably mounted fixedly relative to the vehicle and being retained via a locking means in an engagement position of the worm gear and tooth-profile part, wherein, the locking means is releasable in a controlled manner during a front collision, and wherein the worm gear is thereafter pivoted out of engagement with the tooth-profile part with the result that the inner jacket-tube part is movable into a position shifted furtherest in the direction of the vehicle front.

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**4,941,680**

## MULTIPURPOSE CHASSIS FOR COMMERCIAL AND SPECIAL VEHICLES

**Walter Balker, Chilenstrasse 2, 8433 Weiach, Switzerland**

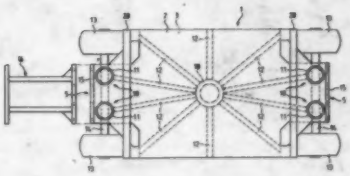
**PCT No. PCT/CH88/00082, § 371 Date Dec. 15, 1988, § 102(e) Date Dec. 15, 1988, PCT Pub. No. WO88/08384, PCT Pub. Date Nov. 3, 1988**

**PCT Filed Apr. 26, 1988, Ser. No. 297,867**

**Claims priority, application Switzerland, Apr. 29, 1987, 1644/87**

**Int. Cl.[5] B62D *21/18***

**U.S. Cl. 280—793** **6 Claims**



1. A multipurpose chassis for commercial and special vehicles comprising

upper and lower carrier plates (2,3) each having a central opening at a central region thereof;

a reinforcing ring (18,35) fixedly attached to said upper and lower plates at said central region substantially aligned with said opening;

first and second pairs of guide tubes (11, 21, 31) fixedly attached to said upper plate at opposite ends of said chassis for receiving suspension apparatus, the longitudinal axes of said guide tubes being substantially perpendicular to said upper plate; and

a plurality of elongated reinforcement member (12, 32, 51) extending between and being fixedly attached to said upper and lower carrier plates and being attached at one end to said ring,

each said reinforcement member having a cross-section shaped to support loads and stabilize said chassis,

said reinforcement members extending generally radially from said reinforcing ring toward the edges of said plates with four said members extending diagonally, two said members extending generally perpendicular to a normal direction of motion of said chassis and four said members extending between and being attached at opposite ends to said ring and said guide tubes.

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**4,941,681**

## SLIDER AND ANCHOR LATCH DEVICE ASSEMBLY FOR PASSIVE SEAT BELT SYSTEM

**Takanobu Sasaki, Yokohama, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**

**Filed Feb. 22, 1989, Ser. No. 313,633**

**Claims priority, application Japan, Feb. 24, 1988, 63-23606**

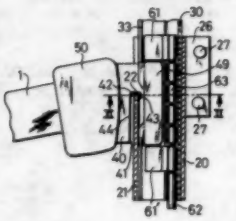
**Int. Cl.[5] B60R *22/00***

**U.S. Cl. 280—804** **9 Claims**

1. An assembly of a slider and an anchor latch device, said assembly being suitable for use in a passive seat belt system of the type that a slider carries a webbing fastened thereto, is provided movably on and along a slide rail between an occupant-restraining position where the webbing may restrain an occupant and an occupant-releasing position where the webbing may release the occupant, and has a slider head received in the slide rail, comprising:

an anchor base formed of a plate-like member and engageable with the slider when the slider is in the restraining

position, said anchor base transversely surrounding the slide rails and having a front wall facing toward a webbing-fastened portion of the slider located in the occupant-restraining position and a pair of side walls extending from the front wall, said slider engaging with said front wall when the slider is in the occupant-restraining position; and



a maintaining means for maintaining the slider and anchor base out of contact at a part of an area of engagement between the slider and anchor base upon engagement thereof, said part being on the side of the slider head and on the side closest to the releasing position.

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**4,941,682**

**ADJUSTING MECHANISM FOR WEBBING-SUPPORTING MEMBER IN PASSIVE SEAT BELT SYSTEM**

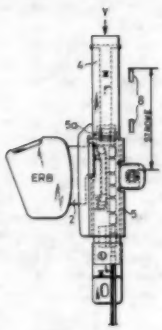
**Kazuo Yamamoto, Kanagawa, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 1, 1989, Ser. No. 318,061**

**Claims priority, application Japan, Mar. 1, 1988, 63-48507**

**Int. Cl.[5] B60R *22/06***

**U.S. Cl. 280—804** **12 Claims**



1. An adjusting mechanism for a webbing-supporting member in a passive seat belt system, comprising:

an elongated member to be mounted on a vehicle body, said elongated member being bent with a predetermined radius of curvature in a direction transverse to the length of the vehicle body;

an anchor base transversely surrounding the elongated member, movable along the length of the elongated member and adapted to support a member to which a webbing is fastened, said anchor base having a pair of planar walls extending straight in the direction of the length of the elongated member and in parallel to each other, whereby a spacing between the bent elongated member and at least one of the planar walls of the anchor base in the direction of the thickness of the elongated member varies along the length of the bent elongated member, reaching a maximum substantially at a longitudinal intermediate portion of the anchor base on a concave side of the elongated member and a maximum substantially at least one of longitudinal ends of the anchor base on a convex side of the elongated member; and a spacer provided between the elongated member and anchor base to substantially fill up the spacing between the elongated member and said at least one planar wall of the anchor base.

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**4,941,683**

**VEHICLE SEAT BELT TIGHTENING SYSTEM**

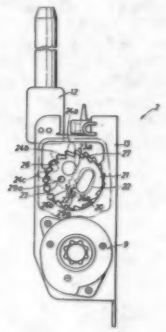
**Hiroshi Tabata; Shizuyo Nakao; Yoshihiko Kin[illegible]a, and Atsushi Katsuki, all of Saitama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 10, 1989, Ser. No. 322,269**

**Claims priority, application Japan, Mar. 11, 1988, 63-57819; Mar. 21, 1988, 63-66990**

**Int. Cl.[5] B60R *22/36***

**U.S. Cl. 280—807** **18 Claims**



1. A vehicle seat belt tightening system for taking up slack from a seat belt in high acceleration or deceleration condition to positively restrain a vehicle occupant but otherwise permitting said seat belt to be paid out to accommodate a movement of said vehicle occupant, comprising:

retractor means having a frame and a winding spool pivotally mounted thereon for winding a seat belt thereon;

said winding spool of said retractor means having a spring-loaded winding spool;

seat belt tightening means integrally attached to said frame at a seat belt outlet end of said retractor means, and provided with clamping means for selectively engaging said seat belt and guide means for guiding a movement of said clamping means in a direction to take up slack from said seat belt;

said guide means comprising a journal bearing for supporting said clamping means for rotational motion around a center line which extends in parallel with the rotational center line of said winding spool;

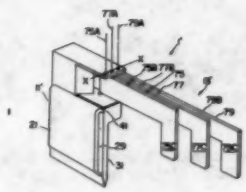
drive means integrally attached to said frame adjacent said seat belt tightening means for selectively activating said seat belt tightening means; and

deceleration detecting means integrally attached to said frame adjacent said drive means for activating said drive means when a level of acceleration or deceleration of a vehicle crash is detected.

## 4,941,684
## AUTOMATIC BOOK MARK

Amos Frank, and Joel Kehat, both of Haifa, Israel, assignors to Joseph D. Ben-Dak, Kiryat, Israel

Filed Aug. 15, 1988, Ser. No. 232,176
Int. Cl.[5] B42D 9/00
U.S. Cl. 281—42 16 Claims



1. A book mark for use in combination with a book having a front cover, a back cover and a spine therebetween, said book mark comprising:

a clamp means for releasable attachment to a book;

a marker means, integrally formed with said clamp means and arranged to extend in use from said clamp means generally outward a said spine of said book, for releasably marking a page in said book;

said clamp means and said marker means formed of a flexible, resilient material;

wherein said clamp means is a substantially U-shaped member, having a first substantially vertical edge and a second substantially vertical edge, comprising:

a substantially vertical first plate-like member forming one of the legs of the U, said first plate-like member having a first end, a second end, a first face and a second face, said second face of said first plate-like member contacting engageable of said book, said first plate-like member having a first flange portion extending substantially horizontally outward from said second face proximate said second end, said first flange portion having an outboard end, a second flange portion extending substantially vertically downward from said outboard end of said first flange portion, said second flange portion substantially parallel to said first plate-like member, said second flange portion having an expanded outer edge of predetermined geometric shape;

a substantially vertical second plate-like member forming the other of the legs of the U, said second plate-like member having a first end, a second end, a first face and a second face, said second face of said second plate-like member contactingly engageable of said book; said second plate-like member having a third flange portion extending substantially horizontally outward from said first face proximate said second end, said third flange portion having an upper face, a bore passing through said third flange portion substantially parallel to said second plate-like member, said bore having a predetermined geometric shape adapted to receive and slidingly engage said expanded outer edge of said second flange portion, a slit formed in said third flange portion and coextensive therewith communicating said upper face of said third flange portion with said bore, said slit adapted to receive and slidingly engage said second flange portion;

said first flange portion, said second flange portion, said third flange portion, said bore and said slit cooperating to interconnect said first plate-like member and said second plate-like member so that said second face of said first plate-like member faces and is disposed substantially parallel to said second face of said second plate-like member for resiliently engaging a portion of said book therebetween;

and wherein said marker means comprises:

an arm member extending substantially horizontally from said first vertical edge of said U-shaped member proximate said first flange portion, said arm member having an outboard end remote from said U-shape member;

a marker member extending substantially vertically downward from said arm member, said marker member contactingly engageable of a page of said book;

and wherein said U-shaped member, said arm member and said marker member cooperate so that, when said U-shaped member engages a portion of said book, with said second vertical edge proximate said spine of said book, and said marker member engages a page of said book, said arm member yieldably urges said marker member into engagement with said page of said book.

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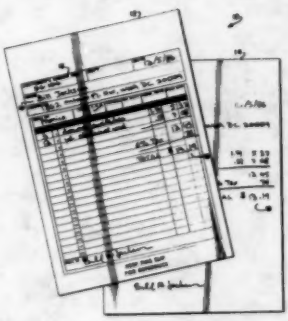
## 4,941,685
## MULTIPLE PART FACSIMILE FORM

Michael W. Anderson, W. Seneca, N.Y., assignor to Moore Business Forms, Inc., Grand Island, N.Y.

Filed Nov. 17, 1988, Ser. No. 272,211
Int. Cl.[5] B41L 1/00; H04N 1/00, 1/40
U.S. Cl. 282—1 R 9 Claims



1. A multi-part form for receiving variable information and transmitting the variable information on a facsimile machine, comprising:

a form set having first and second form parts;

said first form part having preprinted information thereon;

said second form part underlying said first form part and being entirely void of preprinted information thereon; and

means carried by said set for transferring variable information recorded on said first part onto said second part such that the variable information recorded on said second part may be transmitted by facsimile using said second part as the facsimile transmittal copy.

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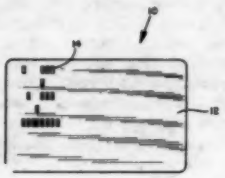
## 4,941,686
## IDENTITY CARD

Charles R. Johnson, 3115 S. Rosanna St., Las Vegas, Nev. 89117

Filed Sep. 19, 1988, Ser. No. 246,367
Int. Cl.[5] B42D 15/00, 15/04, 19/00; B05D 3/12
U.S. Cl. 283—87 15 Claims

1. An optically-readable identity card having a multi-layered laminated construction, the identity card having aperture means in the body of the card for allowing light from a light

source to pass through the aperture means and be sensed by a light sensor, and the multi-layered laminated construction having a central core layer of plastic vinyl which is colored to limit the passage of light through the body of the card.



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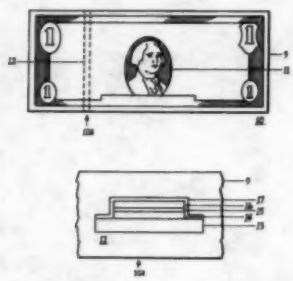
**4,941,687**

**SECURITY PAPER FOR CURRENCY AND BANK NOTES**

**Timothy T. Crane, Dalton, Mass., assignor to Crane & Co., Dalton, Mass.**

**Filed Nov. 9, 1989, Ser. No. 433,916**
**Int. Cl.[5] B42D *15/00*; C23F *1/00***
**U.S. Cl. 283—91** **8 Claims**



1. A security paper comprising:
a sheet of paper having printed indicia on a first surface;
a plastic security strip embedded within said paper;
a first pigmented material selectively applied to said plastic strip;
a plurality of metal characters on said first pigmented material; and
a second pigmented material over said metal characters, whereby said metal characters are thereby visible with transmitted light and invisible under reflected light once embedded in said security paper.

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**4,941,688**

**PERIODIC EVENT RECORDER**

**Truman Jones, 1204 Douglas St., Big Spring, Tex. 79720**

**Filed Nov. 15, 1989, Ser. No. 437,372**
**Int. Cl.[5] B42D *15/00*; G09F *9/00***
**U.S. Cl. 283—72** **19 Claims**

1. A periodic event recorder comprising a label, indicia on the label which correspond to a desired time or frequency interval, a penetrable substrate attached to the underside of the label, means for attaching the underside of the penetrable substrate to an object associated with performance of a desired task, and a stylus adapted to puncture that portion of the label bearing the indicia corresponding to performance of the desired task at a particular time or frequency interval.

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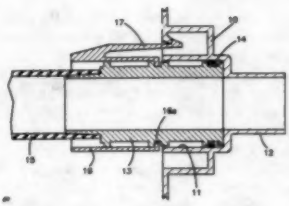
**4,941,689**

**COUPLING DEVICE FOR VACUUM CLEANER**

**Rolf G. Sjöberg, Kungsängen, Sweden, assignor to Aktiebolaget Electrolux, Stockholm, Sweden**

**Filed Nov. 23, 1988, Ser. No. 275,590**
**Claims priority, application Sweden, Feb. 9, 1988, 8800417**
**Int. Cl.[5] A47L *9/24*; F16L *39/02***
**U.S. Cl. 285—7** **1 Claim**



1. A coupling device for releasably connecting a suction hose (15) to the inlet of a vacuum cleaner housing (10), said inlet having a cylindrical socket (11) adapted to receive a tube connection piece (13) attached at one end to the suction hose (15), characterized by a coupling sleeve (16) which by means of a latch means (17) is adapted to be releasably connected to the vacuum cleaner housing in a non-rotatable position, said tube connection piece (13) being rotatably connected within the coupling sleeve (16) and having a portion at the other end provided with a sealing ring (14), said portion extending sealingly into said socket (11) in the connected position.

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**4,941,690**

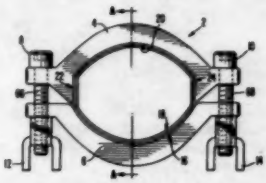
**TUBING CLAMP ASSEMBLY**

**Robert L. Bodine, Sr., 1204 W. Washington St., Lot 7, E. Peoria, Ill. 61611**

**Filed Jun. 21, 1989, Ser. No. 369,624**
**Int. Cl.[5] F16L *35/00***
**U.S. Cl. 285—38** **11 Claims**

1. A tubing clamp for connecting telescoped inner and outer tubes, said tubing clamp comprising a top portion and a bottom portion formed to surround said inner and outer tubes and having a region of contact with said outer tube, the top portion having at least one sharp inwardly-projecting edge, and the bottom portion having at least one sharp inwardly-projecting edge, said tubing clamp having two independent force-applying means for drawing said top portion and bottom portion together about the inner and outer tubes, the force-applying means operating independently of each other to draw the top portion and bottom portion together about the inner and outer tubes so that the inwardly projecting edges of the top portion and bottom portion deform the inner and outer tubes to form at

least one continuous interlocking indented seal about the circumference of the inner and outer tubes, said force applying means including threaded means for connecting the top portion and bottom portion, said threaded means having a shank which is separable from the top and bottom portions of the



tubing clamp and passes through holes provided in said top and bottom portions, said top and bottom portion being shaped so that a portion of the said shank is exposed when the top and bottom portions are tightened onto the tubes, such that the shank may be cut to separate the top portion and bottom portions.

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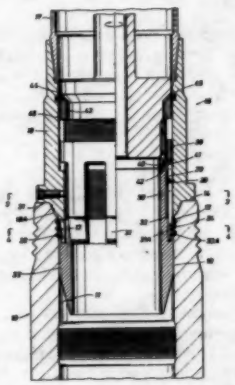
**4,941,691**

## SUBSEA WELLHEAD EQUIPMENT

**Larry E. Reimert, Houston, Tex., assignor to Dril-Quip, Inc., Houston, Tex.**

**Filed Jun. 8, 1988, Ser. No. 204,089**
**Int. Cl.[5] F16L 35/00**
**U.S. Cl. 285—39** **9 Claims**



1. For use in connecting a conductor to a tubular wellhead member mounted in an upright position at a subsea location and having a groove about its bore whose upper end is conically tapered downwardly and outwardly with respect to the bore and upwardly facing seat means about the upper end of the bore, a tieback connector comprising

body means lowerable with the conductor and having a lower end which fits within the bore of the wellhead member, as the body means is so lowered, and downwardly facing shoulder means thereon adapted to be supported on the seat means to prevent further downward movement of the body means,

locking means carried about the body means for disposal opposite the groove, when the shoulder lands on the seat, and being radially movable with respect thereto between an inner position to permit the locking means to move into the bore and an outer position within the groove,

said locking means having conically tapered surfaces on its inner side and downwardly and outwardly conically tapered surfaces on its outer side to conform with the conically tapered upper end of the groove,

wedge means connected to the body means for vertical movement without rotation with respect to the body means and having conical surfaces on its outer side which are complimentary to and slidable over the inner conical surfaces of the locking means and surfaces on its inner side for sliding over an inner surface of the body means generally opposite the locking means, as the wedge body moves in one vertical direction with respect to the body means, so as to wedge the locking means into the groove and the conically tapered surface thereon tightly against the conically tapered surface of the upper end of the groove, and

a nut threadedly connected to the wedge means and mounted on the body means for rotation with respect thereto while being held against vertical movement in said opposite vertical direction,

said nut having means thereon engagable by means on a tool lowered through the conductor for rotating the nut in order to move said wedge means in said one vertical direction.

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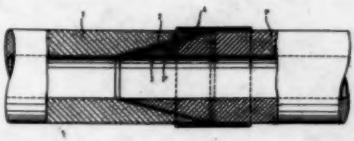
**4,941,692**

## ADHESIVE CONNECTION OF TUBES FORMED OF CARBON OR GRAPHITE

**Kurt Schaffner, Augsburg; Adolf Sweall, Kühlenthal, and Gerhard Ullmann, Gross-Gerau, all of Fed. Rep. of Germany, assignors to SIGRI GmbH, Meitingen, Fed. Rep. of Germany**

**Filed May 22, 1989, Ser. No. 355,486**
**Claims priority, application Fed. Rep. of Germany, May 27, 1988, 3818066**
**Int. Cl.[5] F16L 13/04**
**U.S. Cl. 285—114** **7 Claims**



1. Adhesive connection of conical end surfaces of carbon or graphite tubes, comprising a sleeve formed of fibers and being impregnated with a thermoplast, said sleeve surrounding a given bonding position of two carbon or graphite tubes and being bonded to said tubes, said tubes having conical end surfaces being fitted and adhesively attached together at said given bonding position.

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**4,941,693**

## CONNECTOR FOR AIR DUCTS

**William C. Spande, Seminole; Tod A. Spande, Bushnell, and Amy L. Spande, Daytona Beach, all of Fla., assignors to Spiral Specialties, Inc., Bushnell, Fla.**

**Filed Apr. 18, 1989, Ser. No. 340,086**
**Int. Cl.[5] F16L 25/00**
**U.S. Cl. 285—331** **10 Claims**

1. An annular connector for connecting first and second air ducts, said connector having a central axis, interconnected recessed opposite end segments spaced apart along said axis for respectively receiving said first and second ducts, and an annular middle portion extending between and interconnecting said

recessed end segments, each of said recessed end segments of the connector comprising:

an annular outer member shaped and dimensioned to fit snugly but slidably around a spiral-wound air duct having an external spiral rib thereon;

an annular inner member shaped and dimensioned to fit snugly inside said duct substantially beyond said outer member in the direction along said axis away from said middle portion of the connector, whereby to engage the inside of the corresponding duct substantially beyond said outer member in said direction;

said outer and inner members defining between them an annular recess which is open at the end of said end segment away from said middle portion of the connector to receive said air duct and closed at its end next to said middle portion of the connector by said middle portion;

and sealing mastic filling said recess at said closed end for substantially air-tight engagement with the end of said duct received in said recess.

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**4,941,694**

## POWER ACTUATOR FOR MOTOR-VEHICLE CENTRAL LOCK SYSTEM

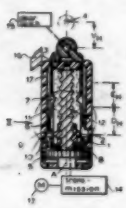
**Peter Bartel, Hattingen, and Rolf Schüler, Heiligenhaus, both of Fed. Rep. of Germany, assignors to Kiekert GmbH & Co. Kommanditgesellschaft, Heiligenhaus, Fed. Rep. of Germany**

**Filed Apr. 25, 1989, Ser. No. 343,584**

**Claims priority, application Fed. Rep. of Germany, Jul. 12, 1988, 3823505**

**Int. Cl.[5] E05B *47/00***

**U.S. Cl. 292—201** **8 Claims**



1. In combination with a door latch actuatable between a locked and an unlocked condition, a power actuator comprising:

a housing fixed adjacent the latch;

a slide linked to the latch and displacesble along an axis in the housing between locked and unlocked positions respectively corresponding to the locked and unlocked conditions of the latch, the slide being formed with a radially elastically deflectable entrainment formation and with a crosspiece;

a spindle extending along the axis;

a nut carried on the spindle and engageable with the entrainment formation and the crosspiece of the slide;

a radially elastically deflectable locking dog axially fixed to the slide and engageable with the nut, the housing being formed with a radially inwardly open recess in which the dog is engageable only in the locked position of the slide; and

drive means including an electric motor connected to the spindle for rotating same and thereby displacing the nut from

an antitheft end position engaging the crosspiece and the dog, pressing the dog into the recess, and positively retaining the slide in the locked position, through

an intermediate position engaging the entrainment formation of the nut in the locked position of the slide and out of engagement with the dog, and into

an unlocked end position engaging the entrainment formation of the nut in the unlocked position of the slide,

the slide being displaceable between its unlocked and locked positions in the unlocked end position of the nut by elastic deflection of the entrainment formation.

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**4,941,695**

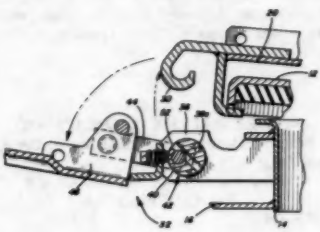
## HATCH COVER ASSEMBLY

**Roy W. Miller, Highland, Ind., assignor to Pullman Leasing Company, Chicago, Ill.**

**Filed May 18, 1989, Ser. No. 353,543**

**Int. Cl.[5] E05C *19/14***

**U.S. Cl. 292—256.5** **13 Claims**



1. In a lading container having a deck means defining a hatch opening, a hatch cover arrangement comprising:

a hatch cover adapted to cover the hatch opening and to act on an associated sealing means around the hatch opening, the hatch cover being pivotable toward and away from the hatch opening;

a latch engagement structure connected with the hatch cover;

a latch structure connected with the deck means and adapted to engage with the latch engagement structure for securing the hatch cover over the hatch opening;

the latch structure including a latch bracket member fixedly connected with the deck means and having a latch bracket aperture therein;

an elongate adjustment member supported in the latch bracket aperture in the bracket member and rotatable therein, said adjustment member defining rotation means for providing a tool bearing surface facilitating the rotation of said adjustment member within said bracket member;

locking means selectively allowing rotation of the adjustment member in the latch bracket aperture and selectively securing the adjustment member against rotation in the latch bracket aperture in one of a plurality of rotated positions of said adjustment member;

pivot means supported by the adjustment member and spaced from the axis of rotation of the adjustment member in the latch bracket aperture, whereby rotation of the adjustment member adjusts the distance of the pivot means from the deck means; and

a latch arrangement operatively associated with the pivot means and adapted to be engagable with the latch engagement structure whereby rotation of the adjustment member adjusts the tightness of the closure of the hatch cover over the hatch opening; and

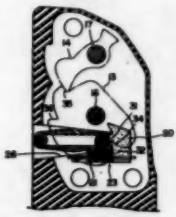
lateral positioning means cooperative with said locking means for maintaining said locking means in lateral adjusted position.

4,941,696

## DOOR LOCK DEVICE FOR VEHICLE

Shinjiro Yamada, and Shuji Nakamura, both of Utsunomiya, Japan, assignors to Mitsue Kinzoku Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Mar. 14, 1989, Ser. No. 322,877
Claims priority, application Japan, Mar. 14, 1988, 63-59843; Mar. 18, 1988, 63-65344
Int. Cl.[5] E05C 3/26
U.S. Cl. 292—340 2 Claims



1. A door locking device for a vehicle comprising a striker secured to the vehicle body and a lock body secured to a door and capable of engaging with said striker, said striker including a U-shaped rod having a horizontal portion and a pair of legs extending perpendicularly from the opposite ends of said horizontal portion, said horizontal portion having upper and lower engagement surfaces becoming narrower as one goes toward the lock body, the lock body having a first advancement groove, into which said horizontal portion is advanced, and a second advancement groove, into which at least one of said legs is advanced, said first advancement groove having an upper surface inclined to be parallel to the upper inclined surface of said horizontal portion and a lower surface provided with a slide piece movable in the direction of movement of said striker, said slide piece having an upper surface inclined to be parallel to the lower engagement surface of said horizontal portion, whereby with engagement of said lock body with said striker in the full-latch state the horizontal portion is clamped between the upper surface of said first advancement groove and the upper surface of said slide piece and wherein a terminal section of said first advancement groove is provided with a first elastic body engaged by said horizontal portion and a second elastic body engaged by said slide piece, said horizontal portion and said first elastic body are engaged with each other before said lock body is fully latched, and said slide piece and said second elastic body are simultaneously engaged with each other before the lock body is fully latched and wherein a terminal section of said first advancement groove is provided with a first elastic body engaged by said horizontal portion and a second elastic body engaged by said slide piece, said horizontal portion and said first elastic body are engaged with each other before said lock body is fully latched, and said slide piece and said second elastic body are simultaneously engaged with each other before the lock body is fully latched.

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4,941,697

## OVER-LOADING IDLING LOCK SET

Caesar Fan, 4Fl., No. 102, Fu Chow Rd., Chung Li, Taiwan

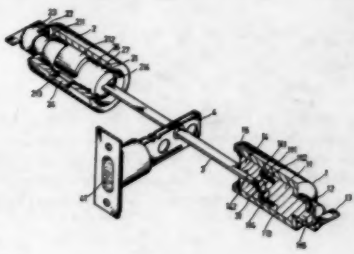
Filed Nov. 28, 1989, Ser. No. 442,126
Int. Cl.[5] E05B 13/00
U.S. Cl. 292—336.3 1 Claim

1. An over-loading idling lock set comprising:

an outdoor body containing a first rotary lock core connected to an outdoor handle disposed outside said outdoor body, a sealing block being disposed on inner side of said lock core, plural ball members being respectively disposed adjacent contacting surfaces of said lock core and sealing block whereby said ball members protrude beyond said lock core and extend into restricting holes, a C-shaped retainer being disposed on inner side of said sealing block and fixed to said outdoor body;

an indoor body containing a second rotary lock core connected to an indoor handle disposed outside said indoor body, an interrupted annular projection being formed on said second lock core, forming a longitudinal groove suitable for receiving a vertically movable controlling bolt, a restoring spring being disposed on inner side of said annular projection, a C-shaped retainer being disposed on inner side of said restoring spring and fixed to said indoor body; and

an actuating shaft, connected to said sealing block and second lock core, capable of driving a latch bolt to open said lock set, whereby when said controlling bolt is inserted into said longitudinal groove to prevent said second lock



core from rotation, a restricting spring applies an insufficient pushing force on said ball members so that said ball members are separate from said restricting holes, causing said outdoor handle to idle without opening said lock set, while when said controlling bolt is pulled out from said longitudinal groove, said ball members are effectively extended into said restricting holes due to sufficient pushing force of restricting springs, and said lock set may be opened by means of rotating said indoor handle and outdoor handle, said second lock core may be pushed forward without pulling up said controlling bolt to move said second lock core forward and separate said controlling bolt from said longitudinal groove, permitting said second lock core to freely rotate whereby by means of rotating said indoor and outdoor handles, said lock set is opened.

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4,941,698

## CHAIN LIFTING PLATE

Jeffrey M. Klibert, Lancaster; Stephen S. Kleinert, Ephrata, both of Pa., and Robert L. Bennett, Humble, Tex., assignors to Lift-All Company, Inc., Manheim, Pa.

Filed Dec. 27, 1988, Ser. No. 290,631
Int. Cl.[5] B66C 1/10
U.S. Cl. 294—82.12 3 Claims

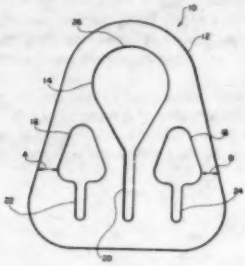
1. A chain lifting plate for use with a chain which has multiple links and hook-shaped end fittings, the chain lifting plate comprising:

a plate with an upper edge, a lower edge, two side edges and at least three holes;

a first hole being located equidistant from the side edges of the plate and having a larger upper portion nearer to the upper edge of the plate with a slot extending down from the upper portion, the slot being located equidistant from the side edges of the plate and being of a width greater than the thickness of the links of a chain with which the chain lifting plate is used, and the upper portion of the first hole being rounded to accept a crane hook;

second and third holes located on the plate in balanced location on both sides of the first hole, the second and third holes each having a larger upper portion nearer to the upper edge of the plate with a slot extending down

from the upper portion, the slot being of a width greater than the thickness of links of a chain with which the chain lifting plate is used, the larger upper portion being too small to freely pass through it an end hook of a chain with which the lifting plate is used, and the upper portions of



the second and third holes being located close enough to a side edge of the plate so that an end hook of a chain used with the plate can be hooked around the plate dimension between the upper portion of each hole and a plate side edge in order to move an end hook through the hole.

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**4,941,699**

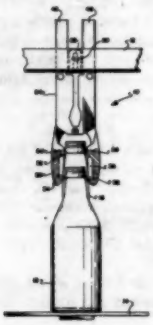
**UNCASER FINGER**

**William G. Wilfong, Mogadore, Ohio, assignor to Figgie International, Inc., Richmond, Va.**

**Filed Oct. 28, 1988, Ser. No. 264,332**

**Int. Cl.[5] B25B *1/04***

**U.S. Cl. 294—99.1** **11 Claims**



1. An uncaser finger, comprising:

a housing;

a pair of opposed jaws, slidably received within said housing;

a plurality of gripping surfaces on each said jaw;

said gripping surfaces of one of said jaws being in opposed alignment with said gripping surfaces on the other of said jaws of said pair, said gripping surfaces comprising a pair of parallel lips extending laterally across a substantially flat surface on said jaws; and

a pair of flanges extending along each side of said substantially flat surface at opposite ends of said lips.

**4,941,700**

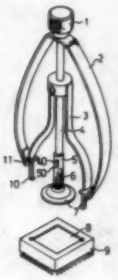
**GATE ARRAY IC PULLER**

**Huoo-Shuenn Lin, No. 23, Lane 4, Chih Huei Street, Pan Chiao, and Juh-San Hsu, No. 22, Chang-Chun Three Street, Taipei, both of Taiwan**

**Filed Sep. 28, 1988, Ser. No. 250,757**

**Int. Cl.[5] B25J *15/12*; H05K *13/04***

**U.S. Cl. 294—99.2** **6 Claims**



1. A tool for pulling an integrated circuit chip having width and top and bottom surfaces from a printed circuit board comprising:

an elongated bolt having upper and lower ends,

a presser board member affixed to the lower end of said elongated bolt moveable from a normal lower position to an upper position for engaging the top surface of an integrated circuit chip,

an inner pair of opposed flat spring members each secured at an upper end to said elongated bolt and at the other end having a pair of inwardly directed opposed hooks normally spaced a predetermined distance from each other, and

an outer pair of opposed bowed, handmanipulable flat spring members each secured at an upper end to the upper end of said elongated bolt and disposed in the same vertical plane as said inner pair of spring members, and each having at a lower end a ring slidably receiving a corresponding spring member of said inner pair, whereby when said outer spring members are pressed together, the spacing between said opposed hooks is narrowed to a spacing less than said predetermined distance for engaging the underside of an integrated circuit chip.

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**4,941,701**

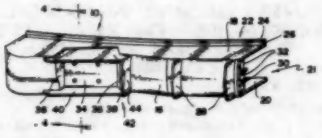
**VEHICLE BUMPER**

**Norman S. Loren, Warren, Mich., assignor to Michael Ladney, Sterling Heights, Mich.**

**Filed Dec. 28, 1987, Ser. No. 138,060**

**Int. Cl.[5] B60R *19/03, 19/22, 19/24***

**U.S. Cl. 293—155** **6 Claims**



1. A bumper beam for use as the principal energy management member in a vehicle bumper of the type adapted to mount to a vehicle at a pair of mounting points (14) spaced

from the longitudinal center line of the vehicle comprising an integrally-molded, one-piece, elongated plastic body (12) having a generally open channel shape (21) defined by upper and lower substantially horizontal surfaces (18,20) joined by a substantially vertical surface (16) and a pair of mounting surfaces 34 formed as recesses in the vertical surface in alignment with the mounting points.

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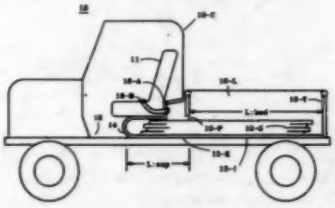
**4,941,702**

## UNDERSEAT EXPANSION BED VEHICLE FOR TRANSPORTING LONG LOAD MATERIAL

**James F. Southward, 1360 5th Ave., Belmont, Calif. 94002**

**Filed Feb. 23, 1989, Ser. No. 314,032**
**Int. Cl.[5] B62D *25/00***
**U.S. Cl. 296—37.6** **23 Claims**



1. A vehicle for personnel and load material, comprising:
personnel section in the front of the vehicle;
a front seating means within the personnel section having a front foot space;
a back seating means within the personnel section having a back foot space;
load section in the back of the vehicle for receiving the load material;
initial bed area in the load section having a length dimension extending in the front-back direction of the vehicle and a width dimension extending in the side-side direction;
a back expansion bed area under the back seating means for expanding the load capacity of the vehicle in the length dimension beyond the initial bed area;
a foot expansion area formed by the foot space for the personnel of the back seating means;
back stop means for preventing the load material from extending beyond the back expansion area, and which is movable for further expanding the load capacity of the vehicle in the length dimension beyond the initial bed area and the back expansion area to include the foot expansion area by permitting the load material to enter the foot expansion area; and
foot stop means for preventing the expansion bed area from extending beyond the foot expansion area.

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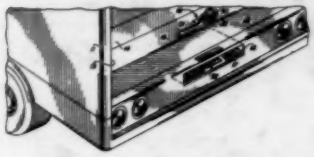
**4,941,703**

## TRUCK RAMP STORAGE SYSTEM

**William J. Curry, Tempe, Ariz., assignor to U-Haul International, Phoenix, Ariz.**

**Filed Apr. 10, 1989, Ser. No. 335,746**
**Int. Cl.[5] B60P *1/43***
**U.S. Cl. 296—37.6** **3 Claims**

2. The combination of a truck body having a loading opening therein giving access to a cargo space therein, a door for closing said opening, a latching mechanism for latching said door in its closed position, said latching mechanism comprising a latch bolt movably mounted on the door and a catch pin on said truck body, a ramp storage space open to the exterior of said truck body, said storage space having its opening closely adjacent the loading opening in the truck body, a ramp insertable into and removable from said ramp storage space through the storage space opening, and a pawl on said latch bolt engagable with said ramp when the latch bolt is in engagement with



said catch pin for preventing removal of said ramp from said ramp storage space.

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**4,941,704**

## SUN VISOR FOR VEHICLES

**Heinz Baumert, Sindelfingen; Ulrich Bruhnke, Ehningen; Ferdinand Greiner, Aidlingen, and Siegfried Nothacker, Weil der Stadt, all of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany**

**Filed Feb. 13, 1989, Ser. No. 309,196**
**Claims priority, application Fed. Rep. of Germany, Feb. 13, 1988, 3804586**
**Int. Cl.[5] B60J *3/02***
**U.S. Cl. 296—97.11** **16 Claims**

1. A sun visor for vehicles having:
a sun visor body which can bend along its longitudinal extension, which can be pivoted out of a rest position into a plurality of use positions, and which can be held in these positions;
at least one bearing having a bearing axis line which extends along a longitudinal edge of the sun visor body in an arcuate line;
pivot means for the pivotable mounting of the sun visor body on a side body of the vehicle;
the sun visor body being rotatably mounted at two end regions on an associated shaft portion of a curved shaft attached to the pivot means;
the sun visor body being pivotably mounted on the curved shaft between the rest position and the use positions;
the sun visor body between its rotatably mounted end regions being guided so as to be rotatable and slideable in the direction of a transverse extension of the sun visor body by an intermediate bearing, engaging in a bifurcated fashion around an associated longitudinal portion of the curved shaft wherein the sun visor body without translation along the curved shaft, automatically changes its bend from a concave configuration along its longitudinal extension, to a flat configuration along its longitudinal extension, and then to a convex configuration along its longitudinal extension as the sun visor body is rotated about the curved shaft from its rest position into its use positions, due to different forces being applied by the curved shaft to end portions of the sun visor body then to a portion of the curved shaft of the sun visor intermediate its end portion; and
the sun visor body being also guided so as to be longitudinally displaceable on the shaft.

4,941,705

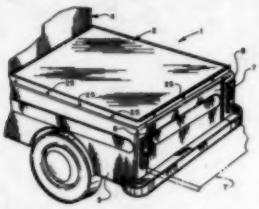
## FRAME ASSEMBLY FOR PICKUP TRUCK BED COVER

David B. Wurtz, 5868 Massillon Rd., Dalton, Ohio 44618

Filed Jul. 10, 1989, Ser. No. 377,316

Int. Cl.[5] B60J 7/10

U.S. Cl. 296—100 16 Claims



1. A combination of a pickup truck, a cover, and a frame assembly for attaching the cover over an open bed of the pickup truck, said truck bed having a pair of spaced, parallel upright sidewalls and a pair of spaced, parallel upright front and rear walls, said rear wall being movable between open and closed positions, said assembly including:

(a) a pair of spaced, parallel elongated side frame members mounted on and extending along the upright sidewalls;

(b) an elongated front frame member mounted on and extending along the upright front wall, and generally between a front end of the side frame members;

(c) means attached to a rear end of each of the side frame members for forming a channel therebetween; and

(d) an elongated rear frame member extending along the upright rear wall, and generally between the rear ends of the side frame members, said rear frame member being directly slideably engageable within the channels formed between the side frame members and the means attached to the rear ends of said side frame members, so that subsequent to detachment of the cover from the frame assembly, the rear frame member is slideably disengaged from said channels to provide unobstructed access to the truck bed upon movement of the rear wall of the truck to the open position.

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4,941,706

## VEHICLE ROOF

Hans Jardin, Inning, Fed. Rep. of Germany, assignor to Webasto AG Fahrzeugtechnik, Gauting, Fed. Rep. of Germany

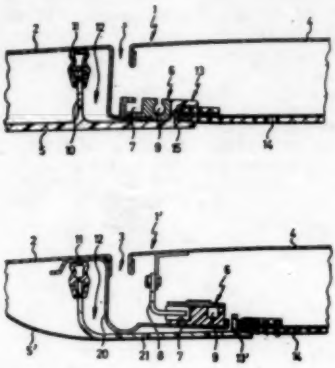
Filed Aug. 15, 1988, Ser. No. 232,174

Claims priority, application Fed. Rep. of Germany, Aug. 20, 1987, 3727721

Int. Cl.[5] B60J 7/00

U.S. Cl. 296—213 10 Claims

1. Vehicle roof having a fixed roof area having an aperture formed therein, a closure panel for selectively opening and closing said aperture, a support frame carrying drive and guide parts for sliding the closure panel, and an interior headlining comprised of a fixed interior headliner for covering an interior side of the fixed roof area, a slidable interior headliner for covering an interior side of said closure panel, guide means for slidably guiding said slidable interior headliner; wherein said fixed interior headliner and said support frame constitute separate structures for separately carrying each of said guide means and said closure panel; wherein said separate structures act in a manner forming a means for enabling the guide means and closure panel to be supported, and adjusted independent of each other, the guide means being carried by said fixed interior headliner and said closure panel being supported upon said support frame.



2. Vehicle roof according to claim 1, wherein said guide means for the slidable interior headliner is an integrally formed portion of said fixed interior headliner.

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4,941,707

## METHOD FOR INSTALLING A CAVITY SEAL ELEMENT INSERTED IN A GROOVE AND AN APPARATUS FOR SETTING A SPACING OF THE GROOVE

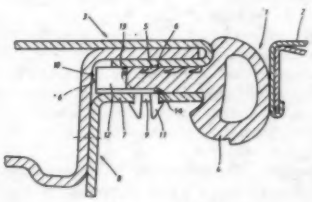
Rolf Öhrle, Herrenberg, and Werner Herlemann, Aidlingen, both of Fed. Rep. of Germany, assignors to Daimler-Benz AG, Fed. Rep. of Germany

Filed Sep. 12, 1988, Ser. No. 242,820

Claims priority, application Fed. Rep. of Germany, Sep. 12, 1987, 3730742

Int. Cl.[5] B60J 7/00

U.S. Cl. 296—216 11 Claims



1. Method for installing a cavity seal element for sealing a gap between a rigid sliding roof and a fixed roof region of a motor car surrounding the rigid sliding roof, the cavity seal element being housed beneath the fixed roof region in a groove formed between the fixed roof region and a rail attached to the roof and having mutually spaced perforations in an upper member, the method comprising the steps of:

setting a predetermined minimum spacing of the groove with a spacing element having a head part for abutting the fixed roof region and a foot part constructed as a clip for insertion into a perforation of the rail and for attaching the spacing element to the rail:

inserting the foot part of each of at least two spacing elements into a respective one of the spaced perforations of the rail;

attaching the rail with the spaced and inserted spacing elements to the roof; and

inserting the cavity seal element into the groove formed between the fixed roof region and the rail when the rail is attached to the roof and spaced by the inserted spacing elements.

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**4,941,708**

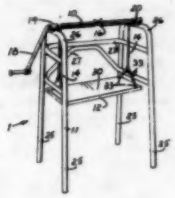
## LIFTING APPARATUS

**H. Hugh Heffner, Rte. 3, Box 47E, Odessa, Mo. 64076**

**Filed Sep. 27, 1988, Ser. No. 249,670**

**Int. Cl.[5] A61H *3/04***

**U.S. Cl. 297—6** **10 Claims**



1. A lifting system adapted to raise a person from the floor to a standing or raised sitting position; said system comprising:

(a) a walker having a plurality of legs and a pair of generally hroizontal and parallel handles adapted to be grasped by a person when using said walker to walk; said walker having a lifting configuration wherein said system may be used to raise a person and a walker configuration wherein the walker may be used by a person to assist in walking;

(b) a lifting apparatus usable with said walker; said apparatus relatively easily being positioned on said walker such that said walker is in the lifting configuration thereof and removed from said walker such that said walker is in the walker configuration thereof; said lifting apparatus, when in use with said walker, having:

(1) a shaft extending between said walker handles;

(2) connecting means including a semi-circular member for selectively positioning and holding said shaft on said handles while allowing rotation of said shaft;

(3) crank means for selectively rotating said shaft;

(4) a seat positioned to hang between said walker handles and being adapted to support the person to be raised; said seat having a lowered position and a plurality of raised positions; and

(5) flexible cord means suspending said seat from said shaft; said cord means winding about said shaft upon rotation of said shaft by said crank means so as to draw said seat toward said shaft, thereby moving said seat from the lowered position to one of the raised positions thereof.

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**4,941,709**

## EXAMINATION CHAIR FOR PLACING A PATIENT IN DESIRED POSITIONS FOR E.G. RADIOLOGICAL EXAMINATION

**Anders Möller, Kullvägen 1, S-135 53 Tyresö , Sweden**

**PCT No. PCT/SE87/00566, § 371 Date Jun. 1, 1988, § 102(e) Date Jun. 1, 1988, PCT Pub. No. WO88/04149, PCT Pub. Date Jun. 16, 1988**

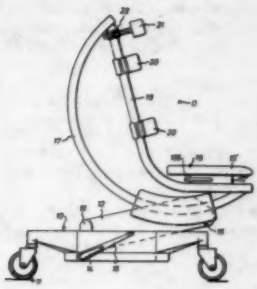
**PCT Filed Nov. 30, 1987, Ser. No. 368,361**

**Claims priority, application Sweden, Dec. 1, 1986, 8605126**

**Int. Cl.[5] A47C *1/02***

**U.S. Cl. 297—325** **7 Claims**

1. Examination chair for placing a patient in desired positions for e.g. radiological examination, especially of the lungs and pleurae, comprising an underframe (10) carrying the seat and back-rest assembly (18, 19, 20, 21) of the chair by means of two parallel, rigidly interconnected circular arc sections (17) which are longitudinally displaceably mounted in holders (16) connected to the underframe and can be locked in the adjusted position characterised in that said holders (16) are affixed adjacent means (12) mounted vertically movable on the underframe (10); that the seat and back-rest assembly (18, 19, 20, 21) is affixed to the circular arc sections (17) by means of parallel elongate members (18) bent at an angle and connected at their opposite ends to said sections adjacent the opposite ends



thereof, said members being positioned between the sections and the center point (0) of the arc form of said sections; that said seat (19) comprises a lower part (19″) fixedly connected to one leg of said elongate members (18), and a patient-receiving upper part (19′) rotatably mounted on said lower part so that the upper part (19′) is rotatable relative to the arc sections (17); and that the back-rest is formed of a plurality of supports displaceably mounted on the other leg of said elongate members (18).

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**4,941,710**

## DEVICE FOR PERMANENTLY INDICATING AN OVERSTRETCHING OF A SAFETY SEAT BELT, ESPECIALLY IN AN AIRCRAFT

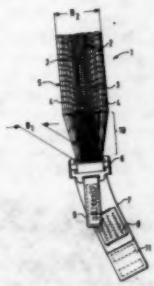
**Faruk Baymak, Hamburg, and Helmut Stueben, Gruenendeich, both of Fed. Rep. of Germany, assignors to Messerschmitt-Boelkow-Blohm GmbH, Munich, Fed. Rep. of Germany**

**Filed Apr. 25, 1988, Ser. No. 185,889**

**Claims priority, application Fed. Rep. of Germany, Apr. 28, 1987, 3714088**

**Int. Cl.[5] A63B *35/00***

**U.S. Cl. 297—471** **7 Claims**



1. A device for permanently indicating an overstretching of a safety belt for restraining a passenger in a seat in a vehicle, especially in an aircraft in the event of an accident, comprising a belt strap woven of weft threads and first and second length-

wise threads or fibers alongside one another, visual indicator means formed by said second threads or fibers as an integral part of said woven belt strap for indicating a first belt strap condition prior to an excessive load application and a second different belt strap condition in response to an excessive load applied to said belt strap, said second threads or fibers having a plastic deformability larger than a respective deformability of said first threads or fibers, whereby said second threads or fibers buckle to form stretch marks in response to excessive deformation to indicate said second belt strap condition, said first belt strap condition without stretch marks signifying a proper operational state of said belt strap, said second belt strap condition signifying, in the form of said stretch marks, which are present in said second threads or fibers but not in said first threads or fibers after an excessive deformation, that said belt strap must be replaced.

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**4,941,711**

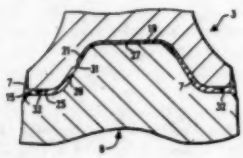
**CEMENTED CARBIDE TIP**

**Stephen P. Stiffler, New Enterprise, Pa., assignor to Kennametal Inc., Latrobe, Pa.**

**Continuation-in-part of Ser. No. 221,819, Jul. 20, 1988. This application Jan. 27, 1989, Ser. No. 303,514**

**Int. Cl.[5] E21B *10/46***

**U.S. Cl. 299—79** **16 Claims**



1. A cemented carbide tip for attachment to a ferrous metal body to form an excavating cutter bit, said tip comprising:

a forward end for engaging and excavating asphalt;

a rearward end for attachment to an end of said ferrous metal body;

said tip being rotationally symmetric about a longitudinal axis extending from said forward end to said rearward end;

said rearward end having an annular rearwardly facing outer surface and an inner socket extending forwardly therefrom and being shaped to fit with a protrusion on the ferrous body end;

means protruding from said rearward end for engaging the ferrous body end and placing said tip in a spaced relationship relative thereto for facilitating formation therebetween of a braze joint having a predetermined cross-sectional thickness profile;

wherein said protruding means includes a plurality of first bumps formed on said inner socket of said rearward end and being spaced from one another, and a plurality of second bumps formed on said outer surface of said rearward end and being spaced from one another.

7. A cemented carbide tip comprising:

a forward end for engaging an earth formation;

a rearward end for attachment to an end of a ferrous metal body;

said tip being rotationally symmetric about a longitudinal axis extending from said forward end to said rearward end;

said rearward end having an annular rearwardly facing outer surface having a portion lying perpendicular to said longitudinal axis and an inner socket extending forwardly from said annular rearwardly facing outer surface and being shaped to fit with a protrusion on the ferrous body end;

means protruding from said rearward end on said outer surface thereof for engaging the ferrous body end and placing said tip in a spaced relationship relative thereto for facilitating formation therebetween of a braze joint having a predetermined cross-sectional thickness profile; and

wherein said protruding means includes a plurality of bumps spaced from one another and formed on said portion of said outer surface of said rearward end.

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**4,941,712**

**BRAKE FLUID PRESSURE CONTROL APPARATUS IN AN ANTI-LOCK CONTROL SYSTEM**

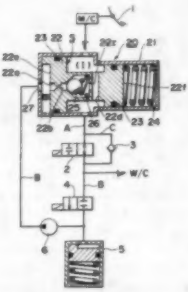
**Yoshiaki Hirobe, Shiraoka, Japan, assignor to Akebono Brake Industry Co., Ltd., Saitama, Japan**

**Filed Dec. 14, 1988, Ser. No. 284,389**

**Claims priority, application Japan, Dec. 19, 1987, 62-336402**

**Int. Cl.[5] B60T *8/62***

**U.S. Cl. 303—115** **6 Claims**

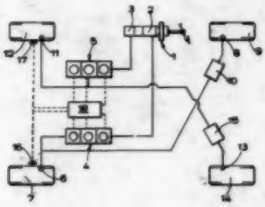


1. A brake fluid pressure control apparatus of a type equipped with an electromagnetic valve device for controlling communication between a master cylinder and wheel cylinders through a supply passage and communication between the wheel cylinders and a reservoir through a return passage, and a hydraulic pump for returning the brake fluid in said reservoir to said supply passage; said brake fluid pressure control apparatus comprising: a fluid pressure control valve provided in said supply passage between said master cylinder and said electromagnetic valve device; a stepped piston having a relatively large surface area at one end and a relatively smaller surface area at the other end slidably fitted into said pressure control valve and urged from the side of the small surface area by means of a return spring; a fluid pressure chamber formed between a stepped portion of said stepped piston and a housing of said fluid pressure control valve in such a manner as to communicate with said supply passage; a back pressure chamber formed at said one end of said stepped piston in such a manner as to communicate with said hydraulic pump so that a return-pressure-fluid from said wheel cylinders, at the time of a decrease of the pressure during anti-lock control, is pressurized by means of said hydraulic pump, is introduced into said back pressure chamber to achieve a pressure accumulation therein by moving said stepped piston against the force of said return spring, and is returned to the master cylinder in an amount corresponding to the change in volume of said fluid pressure which change corresponds to the movement of said stepped piston, and further comprising a return fluid passage and a check valve provided in said stepped piston for returning the return-pressure-fluid to the master cylinder, said return fluid passage including a throttle portion.

## 4,941,713
## HYDRAULIC ANTI-LOCK BRAKING SYSTEMS FOR VEHICLES

Glyn P. R. Farr, Warwickshire, England, assignor to Lucas Industries, Birmingham, England

Filed May 5, 1989, Ser. No. 348,205
Claims priority, application United Kingdom, May 10, 1988, 8811013
Int. Cl.[5] B60T 8/40
U.S. Cl. 303—116 12 Claims



1. An hydraulic anti-lock braking system for a vehicle comprising a brake on a wheel, an hydraulic master cylinder for supplying hydraulic fluid under pressure to said brake to apply said brake, a first passage between said master cylinder and said brake, sensor means responsive to the behaviour of said wheel, a control module responsive to signals from said sensor means, modulator means for modulating the supply of fluid from said master cylinder to said brake in accordance with signals from said control module, said modulator means comprising an expansion chamber to which fluid is dumped from said brake, a return passage from said brake to said expansion chamber and through which said fluid is adapted to be dumped, a pump having an output adapted to generate the energy necessary to recover fluid from said expansion chamber to re-apply said brake automatically after said pressure fluid applied to said brake has first been released to said expansion chamber through said return passage, said pump withdrawing from said expansion chamber the actual fluid dumped from said brake, a second passage between said pump and said master cylinder, a third passage between said pump and said brake, a valve assembly responsive to signals from said control module, wherein said valve assembly comprises an inlet valve disposed in said first passage for controlling communication between said master cylinder and said brake, a re-application valve disposed in said third passage for controlling communication between said output from said pump and said brake, and a dump valve disposed in said return passage for controlling communication between said brake and said expansion chamber, a one-way valve in said second passage to permit flow of fluid in a first direction from said pump to said master cylinder but to prevent flow in a second opposite direction, a first connection between said control module and said inlet valve, and a second connection between said control module and said re-application and dump valves, whereby said inlet valve, and said re-application and dump valves are operable independently in a predetermined sequence by said control module in accordance with the nature of a given signal from said sensor.

## 4,941,714
## JEWELRY DISPLAY AND SERVICING KIOSK

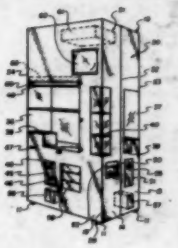
Anthony Seymour, 4460 South Highland Dr., Salt Lake City, Utah 84124

Filed Oct. 10, 1989, Ser. No. 418,520
Int. Cl.[5] A24F 25/00
U.S. Cl. 312—31 11 Claims

1. A jewelry display device for positioning in either free-standing condition or against a wall, said display device comprising:

an upright enclosure including top and bottom covers and at least two display walls having exterior and interior wall faces coupled to the top and bottom covers and having recessed shelving at the exterior wall faces for supporting items of jewelry in an ornamental display, said display walls being respectively joined to each other at lateral edges to form a continuous, free-standing wall which obscures view of the interior wall faces of the enclosure from an exterior location;

steam cleaning apparatus coupled at an exterior face of one of the display walls, said apparatus including a small opening communicating with the enclosed contained area;



steam generating means positioned within the contained area for generating a source of steam under pressure;

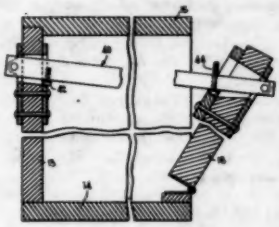
steam transmission conduit coupled to the generating means and extending through the small opening to provide an applicator end for the steam cleaning apparatus;

a valve controlled outlet coupled in line with the steam transmission conduit for releasing steam as part of the cleaning apparatus.

## 4,941,715
## VERTICAL FILING CABINET CONTAINING TELESCOPIC HANGING ASSEMBLIES WITH ADJUSTABLE SUPPORT MEANS CONNECTED THERETO

Adolf Schreiber, Red Lion, Pa., assignor to H. Schreiber Company, Red Lion, Pa.

Filed Jan. 25, 1989, Ser. No. 301,809
Int. Cl.[5] A47B 63/02
U.S. Cl. 312—184 7 Claims



1. A vertical filing cabinet which comprises left and right side walls, a rear wall, a bottom, a top and a front wall, said front wall including a door which can pivot about a horizontal axis, a telescopic hanging assembly which extends between said rear wall and said door to support objects to be suspended within the interior of said cabinet, said telescopic hanging assembly including a first end that is pivotally supported by said door and a second end that is pivotally supported by said rear wall, and an adjustable support means connected to said telescopic hanging assembly to provide support to said telescopic hanging assembly whenever said door is opened to a

desired degree, said adjustable support means having a first portion movably located within said telescopic hanging assembly and a second portion that is located exteriorly of said telescopic hanging assembly, said second portion having a head end that abuts one of said rear wall and said door when said door is opened to said desired degree.

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**4,941,716**

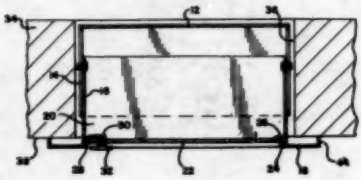
**CABINET CONSTRUCTION**

**Eugene P. Rome, 1730 N. 77th Ave., Elmwood Park, Ill. 60135, and Carl P. Rome, 28 W. 172 Roosevelt, Winfield, Ill. 60190**

**Filed Jan. 3, 1986, Ser. No. 815,917**

**Int. Cl.[5] H47B *45/00***

**U.S. Cl. 312—205** **19 Claims**



1. A cabinet construction receivable within a recess defined by a wall supporting the cabinet, said cabinet defining an enclosure formed by a back panel positioned at the rear of the recess, side panels, a front panel, an opening defined by the front panel, and a door hinged to said front panel to close said opening and to permit access to the interior of the cabinet, and said front panel defining flanges adapted to extend over surfaces on said wall surrounding said recess, said side panels comprising first and second portions, one side panel portion being associated with said back panel and the other side panel portion being associated with said front panel, said side panel portions being telescopically arranged with respect to each other, means permitting adjustment of the relative positions of said side panel portions whereby the distance between the front and back panels can be adjusted to vary the depth of the cabinet interior, and means for securing said side panel portions in a selected position with respect to each other.

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**4,941,717**

**KNOCKDOWN TABLE AND CABINET STRUCTURE**

**Bryan J. Beaulieu, Burnsville, Minn., assignor to Skyline Displays, Inc., Burnsville, Minn.**

**Filed Oct. 10, 1989, Ser. No. 419,382**

**Int. Cl.[5] A47B *48/00***

**U.S. Cl. 312—265.3** **13 Claims**

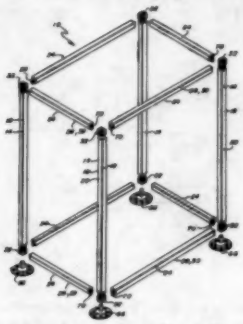
1. A knockdown table and cabinet structure adapted for ease of assembly and disassembly, comprising:

(a) a plurality of hollow tubular frame member of substantially square cross section, the frame members including first and second groups;

(b) a plurality of fastening devices, each fastening device having a slidably insertable end adapted for slidable insertion into the end of a tubular frame member of the first group with a wide guide slot therein and an extending end with a narrow locking slot bridging into the guide slot; a shoulder at the junction of the slidably insertable end and the extending end, said shoulder sized to abut against the end of a tubular frame member and thereby to limit the extending end from ingress into said tubular frame member;

(c) resilient fastening means for joining together a pair of said fastening devices at opposite ends of a tubular frame member, passing inside said tubular frame member, said resilient fastening means permitting partial egress of said slidably insertable ends from said tubular frame member and resiliently urging said pair of fastening devices inwardly toward abutment of said shoulders against respective ends of said tubular frame member;

(d) a plurality of end connectors, each connector having a slidably insertable end adapted for insertion and affixing into the end of a tubular frame member AND second group and a projecting male connector end of a dimension sized to be readily insertable into the guide slot but not



insertable into the locking slot but movable into the locking slot from the guide slot for rigid and secure locking engagement of the respective frame members together, said locking engagement being aided by the resilient fastening means holding respective pairs of said fastening devices inwardly in said tubular frame members to abut said shoulders against respective ends of said tubular frame members.

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**4,941,718**

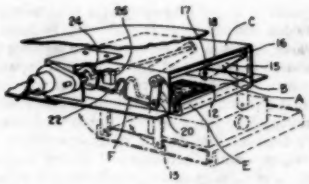
**CONCEALED RETRACTABLE HOUSINGS**

**William J. Alexander, III, Mauldin, and Fred A. Chapman, Simpsonville, both of S.C., assignors to Alexander Machinery, Inc., Mauldin, S.C.**

**Filed Mar. 21, 1988, Ser. No. 171,038**

**Int. Cl.[5] A47B *88/22***

**U.S. Cl. 312—312** **4 Claims**



1. Apparatus for concealing an article between a ceiling and a roof comprising:

a frame between the ceiling and the roof;

a lower support for said article;

pivotal means pivotally mounted to said frame and said lower support carrying said support for movement from a retracted position within said frame between the roof and ceiling to a position below the ceiling;

said pivotal means including means for lowering and swinging forward said lower support;

electrically operated means operating said pivotal means for movement of said support from said retracted position to said position below the ceiling and for returning said support to said retracted position;

said means pivotal means including for maintaining said lower support level during movement; and

switch means actuating said electrically operated means;

whereby said position below the ceiling is below and in front of said retracted position.

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**4,941,719**

**LIGHT SCANNING SYSTEM**

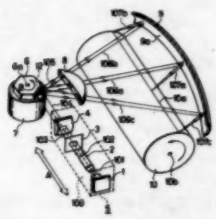
**Takanori Hisada; Takesuke Maruyama; Masaharu Deguchi; Yoshihiko Noro, all of Yokohama; Yoshifumi Honma, Hitachi; Yoshio Ariki, and Shunichi Taguchi, both of Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed May 22, 1987, Ser. No. 52,884**

**Claims priority, application Japan, May 23, 1986, 61-117227**

**Int. Cl.[5] G02B *26/10***

**U.S. Cl. 350—6.8** **1 Claim**



1. A light scanning system for scanning a light beam onto an image surface comprising:

light means for generating a light beam;

light deflecting means having a rotating mirror with a reflecting surface for deflecting an incoming light beam from said light means;

focusing means disposed between said light means and said light deflecting means for focusing the light beam upon said reflecting surface of said rotating mirror of said light deflecting means to a line image;

field curvature correcting means including a single spherical leans provided with a spherical surface and having positive power for focusing the light beam deflected by said light deflecting means onto said image surface, and said spherical lens enabling correction of the field curvature and partial correction of the scan-nonlinearity of an image formed on said image surface;

a first reflecting mirror disposed in the scan plane with its optical axis inclined at an angle of $\theta_3$ ($\theta_3 \neq 0$) with the scan plane for reflecting the light beam passing through said spherical lens;

scan-nonlinearity correcting means including a second reflecting mirror with a toric-surface having a first circular arc with a larger radius of curvature in a first plane which is larger than a second radius curvature in a second plane perpendicular to the first plane, said second reflecting mirror of said scan-nonlinearity correcting means being disposed for reflecting the light beam reflected by said first reflecting mirror and for enabling correction of the scan-nonlinearity of the light beam which is not corrected by said spherical lens and having the toric-surface thereof with a concave shape optically facing said spherical lens, said toric-surface reflecting mirror of said scan-nonlinearity correcting means establishing an optically conjugated relationship between said reflecting surface of said rotating mirror of said light deflecting means and said image surface for preventing of the displacement of the light beam from the scan plane formed by the deflected light beam resulting from a tilt of said first reflecting surface of said rotating mirror of said light deflecting means, and said toric-surface reflecting mirror of said scan-nonlinearity correcting means being disposed with its optical axis inclined at an angle of $\theta_2$ ($\theta_2 \neq 0$) with a scan plane formed by the light beam reflected on said first reflecting mirror, and said $\theta_2$ being defined by the relation:

$$-\frac{0.3}{S} < \sin\theta_2 < \frac{0.3}{S}$$

$$S = R - \sqrt{R^2 - (d/2)^2}$$

where R represents the larger radius of curvature of said toric-surfaced reflecting mirror and d represents the distance in the scanning direction of said toric-surfaced reflecting mirror.

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**4,941,720**

**OPTICAL CABLE NETWORK WITH AN EXCESS NUMBER OF LEADS IN RESERVE**

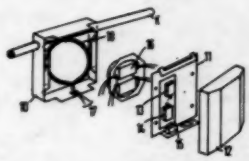
**Karlhorst Barwig, Herrsching; Gerd Ortkrass, Egling, and Guenther Klimasek, Berlin, all of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Feb. 7, 1989, Ser. No. 307,009**

**Claims priority, application Fed. Rep. of Germany, Mar. 15, 1988, 3808664**

**Int. Cl.[5] G02B *6/36***

**U.S. Cl. 350—96.2** **6 Claims**



1. In an optical cable network constructed with light waveguide cables for one or more transmission systems selected from ring systems, star systems and bus systems, said cable network comprising a plurality of existing and, respectively, planned connecting points for individual system nodes, the improvements comprising all existing and, respectively, further planned connecting nodes of the optical cable network being connected in series with one another by means of a prescribed plurality of through light waveguide leads, which are each composed of two fibers, in one or more light waveguide cables, a number of leads of said plurality of through light waveguide leads being determined based on the maximum size of said network, each of the through light waveguide leads being laid in multiple loops at each connecting point for forming a cable reserve and only those light waveguide leads required for a system connection at each connecting point being cut to provide free ends which are connected to the system components by a splice.

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**4,941,721**

**RASTER SCANNING SYSTEM UTILIZING OVERFILLED POLYGON FACET DESIGN**

**Martin E. Banton, Fairport, and Michael E. Harrigan, Webster, both of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Jun. 1, 1989, Ser. No. 359,604**

**Int. Cl.[5] G02B *26/10, 13/18***

**U.S. Cl. 350—6.8** **3 Claims**

1. A raster input scanning system utilizing an overfilled

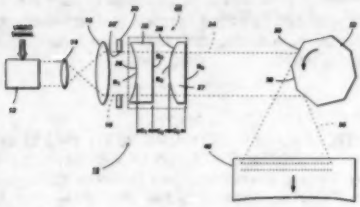
polygon facet design for forming lens images at a photosensitive medium comprising:

means for providing a beam of radiant energy,

means for modulating said energy beam in response to electrical signals,

means for expanding the modulated beam,

a polygon having at least one reflective facet positioned in the optical path of said modulated beam and adapted to scan said spot across said medium, and



an aspheric lens system positioned between said modulating means and said polygon, said aspheric lens adapted to transform the modulated output beam into a beam having a generally flat uniform intensity profile which overfills said facet as it rotates therethrough, said aspheric lens system comprising a first negative lens element and a second positive lens element each of said lens elements having one aspherical surface, and one generally planar surface.

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4,941,722

LIGHT BEAM DEFLECTOR

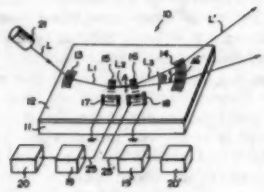
Masami Hatori, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed May 23, 1989, Ser. No. 355,519

Claims priority, application Japan, May 27, 1988, 63-130015

Int. Cl.[5] G02B 6/10

U.S. Cl. 350—96.13 4 Claims



1. A light beam deflector comprising:

(i) an optical waveguide made of a material capable of propagating surface elastic waves therethrough;

(ii) n (n≧2) surface elastic wave generating means for generating in said optical waveguide surface elastic waves which travel across the path of a guided wave traveling in said optical wave guide, thereby diffracting and deflecting said guided wave n times and amplifying the deflection of the guided wave caused by the diffraction thereof;

wherein each of said n surface elastic wave generating means comprises an interdigital transducer having electrode fingers spaced at distances that very stepwise, and a driver for applying an alternating voltage having a continuously varying high frequency to said interdigital transducer; and

wherein said drivers have means for applying alternating voltages having frequencies shifted from each other to said interdigital transducers, respectively, so that periodic variations in the intensities of the surface elastic waves generated respectively from said interdigital transducers will not amplify each other.

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4,941,723

ROD SHAPED LINEAR LIGHT DIFFUSION APPARATUS

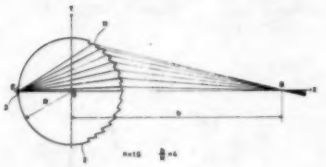
Shigeru Sasada, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Mar. 15, 1989, Ser. No. 324,399

Claims priority, application Japan, Mar. 18, 1988, 63-63400; Apr. 5, 1988, 63-82323; Apr. 6, 1988, 63-83127

Int. Cl.[5] G02B 6/00, 3/04, 3/08

U.S. Cl. 350—96.10 23 Claims



1. A method of converging light rays, said method comprising the steps of:

(a) transmitting light in an axial direction through a transparent axial rod;

(b) irregularly reflecting rays of said light from an elongated first surface of said transparent axial rod; and

(c) converging said rays by refracting said rays at an elongated second surface of said transparent axial rod.

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4,941,724

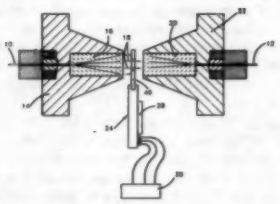
OPTICAL FIBER CONNECTION UTILIZING PHOTODIODE MEANS

Donald V. Couden, Boca Raton; Paul C. Karr, Ormond Beach, and Layton Balliet, Boca Raton, all of Fla., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Aug. 29, 1988, Ser. No. 237,338

Int. Cl.[5] G02B 6/32

U.S. Cl. 350—96.18 5 Claims



1. Apparatus for tapping a fiber optic system, which system includes first and second optical fibers, comprising;

(a) first lense means adapted to be optically connected to said first optical fiber for collimating light transmitted by said first optical fiber on a light path;

(b) second lense means, spaced from and in optical alignment with said first lense means, adapted to be optically connected to said second optical fiber for decollimating light received from said first lense means and providing said decollimated light to said second optical fiber; and

(c) discrete sensing means interposed intermediately between said first and second lense means and physically positioned to intercept a minor portion of the collimated light from said first lense means, and adapted to generate

a signal indicative of a characteristic of said collimated light;

wherein said sensing means includes a photodiode characterized by support means carrying said photodiode, said support means being further characterized by aperture means therein positioned to pass a major portion of the collimated light;

whereby, a minor portion of the light transmitted is used to tap a signal by said photodiode and a major portion is passed on through said aperture means.

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**4,941,725**

## ALL-OPTICAL PLANAR MODULATOR STRUCTURE WITH CHANNEL WAVEGUIDES

**Richard J. F. Normandin, Ottawa, Canada, assignor to Canadian Patents & Development Limited, Ottawa, Canada**

**Continuation-in-part of Ser. No. 228,473, Aug. 5, 1988, Pat. No. 4,867,515. This application Aug. 25, 1989, Ser. No. 398,647**

**Int. Cl.[5] G02B *6/10***

**U.S. Cl. 350—96.13** **9 Claims**

1. A planar optical modulator structure comprising:

a plurality of channel waveguides having a substrate and a plurality of channels provided thereon,

each of the said plurality of channels having the refractive index higher than that of the said substrate for transmitting therethrough under a guiding condition a beam of light having the wavelength longer than the bandgap energy of the said channel and having a buffer layer thereon,

a plurality of input fiber optics optically coupled to the said plurality of channels for sending the beams of light thereinto,

a plurality of output fiber optics optically coupled to the said channels for receiving the said beams of light therefrom, and

a plurality of control means, each made of a plastic material having a higher refractive index than that of the buffer layer and positioned between the said channels, and

the said control means for carrying beams of control light therethrough, each having the wavelength shorter than the said bandgap energy, in that

light deviation means are provided in the control means to direct a predetermined amount of the said beams of control light perpendicularly to the said plurality of channels through the said buffer layer,

so that each beam of control light lowers the effective refractive index of each channel to a cutoff level to disturb the said guiding condition.

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**4,941,726**

## TAPERED FIBER AMPLIFIER

**Stephen D. Russell, San Diego, and Timothy C. Stamnitz, Encinitas, both of Calif., assignors to The Unites States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Aug. 31, 1988, Ser. No. 239,158**

**Int. Cl.[5] G02B *6/26, 7/42***

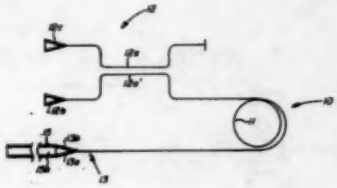
**U.S. Cl. 350—96.15** **8 Claims**

1. An apparatus for amplifying data signals comprising:

a first tapered optical portion optically coupled to receive the data signals at an input end, and having a light transmission portion interposed between the input end and an output end, the first tapered optical portion being fabricated so as not to disturb single-mode and the input end has a greater area than the output end, thereby concentrating the data signal intensity therethrough;

a source of optical pump signals;

a second tapered optical portion optically coupled to receive the optical pump signals at an input end and having a light transmissive portion interposed between the input end and an output end, the second tapered optical portion being



fabricated as not to disturb single-mode and the input end has a greater area than the output end thereby concentrating the pump signal intensity therethrough;

a coupler section coupled to receive the concentrated data signal intensity from the first tapered optical section and the concentrated pump signal intensity from the second tapered optical section; and

means optically coupled to the coupler section having a sufficient length of optical transmissive material for optically amplifying the data signals by Raman effect.

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**4,941,727**

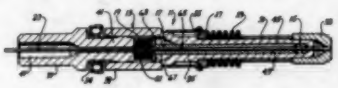
## CRIMPABLE FIBER OPTIC TERMINUS

**Jack J. Maranto, Capistrano Beach, and Norbert L. Moulin, Placentia, both of Calif., assignors to Hughes Aircraft Company, Los Angeles, Calif.**

**Filed Aug. 5, 1988, Ser. No. 229,378**

**Int. Cl.[5] G02B *6/36***

**U.S. Cl. 350—96.20** **12 Claims**



1. A fiber optic terminus comprising:

a body having a passage therein;

an elastomeric coupling element confined in said passage, said coupling element having a passage adapted to receive a portion of the optical fiber;

said coupling element being resiliently deformable to constrict said passage of the coupling element by expanding radially and compressing axially in response to a force on the coupling element acting generally longitudinally of at least a region of the passage through the coupling element; and

means including a resilient member for applying said force to the coupling element so as to cause the coupling element to translate at least a portion of said force to said optical fiber and thereby frictionally grip said fiber in the passage of the coupling element.

4,941,728

## OPTICAL FIBER PLUG-IN CONNECTION HAVING A RADIALLY ELASTICALLY SUPPORTED PLUG PIN

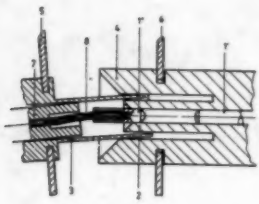
Anton Pautz, Munich, and Manfred Lang, Taufkirchen, both of Fed. Rep. of Germany, assignors to Spinner GmbH, Elektrotechnische Fabrik, Munich, Fed. Rep. of Germany

Filed Feb. 3, 1988, Ser. No. 151,926

Claims priority, application Fed. Rep. of Germany, Feb. 10, 1987, 3704070

Int. Cl.[5] G02B *6/38*

U.S. Cl. 350—96.21 6 Claims



1. An optical fiber plug-in connection, comprising:

a coupler including a coupler centering sleeve, a coupler sleeve centrally retained within said coupler centering sleeve and a fiber containing coupler pin accommodated in said coupler sleeve;

a plug including a plug centering sleeve insertable in said coupler centering sleeve, a cable clamp supported in said plug centering sleeve, and a fiber containing plug pin; and

support means for radially elastically supporting said plug pin relative to said cable clamp, said support means including a flexible tube enclosing said fiber and connecting said plug pin with said cable clamp.

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4,941,729

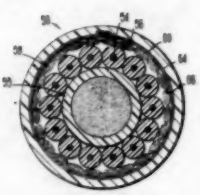
## BUILDING CABLES WHICH INCLUDE NON-HALOGENATED PLASTIC MATERIALS

Tommy G. Hardin, Lilburn, and Behrooz A. Khorramian, Norcross, both of Ga., assignors to AT&T Bell Laboratories, Murray Hill, N.J.

Filed Jan. 27, 1989, Ser. No. 303,172

Int. Cl.[5] G02B *6/44, 6/00;* H02G *15/02*

U.S. Cl. 350—96.23 15 Claims



1. A communication cable, which comprises:

a core which comprises at least one transmission medium;

a plastic material which encloses said at least one transmission medium;

a jacket which comprises a plastic material and which encloses said at least one transmission medium;

said plastic material which encloses said at least one transmission medium and said plastic material of said jacket each including a plastic material which is selected from the group consisting of a filled polyolefin, a polyetherimide, a silicone-polyimide copolymer, and blend compositions of a polyetherimide and a silicone-polyimide copolymer; and

a thermal barrier which is disposed between said at least one transmission medium and said jacket, said thermal barrier being a laminate comprising a layer of a metallic material and a layer of a plastic material which is selected from the group consisting of a polyetherimide, a silicone-polyimide copolymer, a polyimide, and blend compositions of a polyetherimide and a silicone-polyimide copolymer.

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4,941,730

## PLASTIC OPTICAL TRANSMITTABLE FIBERS

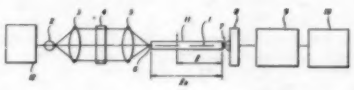
Minoru Takase; Naoya Ueno, and Toshimi Arashi, all of Chiba, Japan, assignors to Idemitsu Petrochemical Company Limited, Tokyo, Japan

Filed May 13, 1988, Ser. No. 193,609

Claims priority, application Japan, May 15, 1987, 62-118192

Int. Cl.[5] G02B *1/04, 6/02*

U.S. Cl. 350—96.34 6 Claims



1. A plastic optical transmittable fiber comprising a core and a cladding, the cladding comprising a copolymer containing 70 to 99.5 mole % of 4-methyl pentene-1 units and 30 to 0.5 mole % of units of an α-olefin of 2 to 24 carbon atoms, and a polycarbonate core material having a refractive index higher than that of the cladding by at least 0.01.

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4,941,731

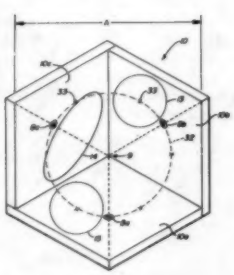
## CORNER CUBE UTILIZING GENERALLY SPHERICAL SURFACES

John Macken, 3300 Coffey La., Santa Rosa, Calif. 95401

Filed Jul. 1, 1987, Ser. No. 68,939

Int. Cl.[5] G02B *5/122*

U.S. Cl. 350—102 10 Claims



1. A method of making a corner cube exhibiting optical power comprising:

Providing three mirrors, generally spherical in shape, each mirror having a generally spherical surface having a radius of curvature generally equal to R; positioning said spherical surfaces such that each of said three spherical surfaces has a point of tangency to an imaginary perfect corner cube; and sizing each of said three mirrors to form a corner cube having an aperture size A, where R is greater than 3A.

**4,941,732**

## TRANSMISSION TYPE PROJECTION SCREEN

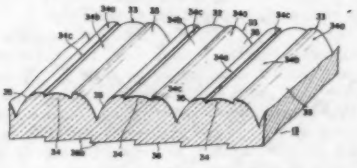
**Osamu Umeda, Gifu; Tohru Nakakusu, Hoya; Makoto Sato, Fussa, and Tatsuo Shimazaki, Tokyo, all of Japan, assignors to Casio Computer Co., Ltd., Tokyo, Japan**

**Continuation-in-part of Ser. No. 79,883, Jul. 30, 1987, Pat. No. 4,875,064. This application May 31, 1989, Ser. No. 359,399**

**Claims priority, application Japan, Aug. 6, 1986, 61-119814[U]; Mar. 28, 1987, 62-46179[U]; Jul. 3, 1987, 62-101814[U]**

**Int. Cl.[5] G03B *21/60***

**U.S. Cl. 350—128** **16 Claims**



1. A back-surface projection screen for observing a light image, projected from the rear surface of a screen, on a front surface side, which comprises a lenticular lens constructed of a great number of lens units in a continuous array with a top surface section defined as a lens section and with a total-reflection surface formed at each side of the lens section, in which, with respect to a central area of the lens section of each lens unit, linear surfaces are provided in an opposed relation at the total-reflection surfaces of each lens unit.

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**4,941,733**

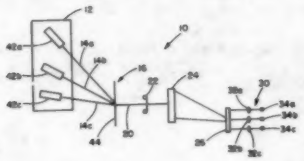
## OPTICAL CORRELATOR SYSTEM

**Kenneth G. Leib, Wantagh, N.Y., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Apr. 7, 1989, Ser. No. 334,928**

**Int. Cl.[5] G02B *27/46, 5/32***

**U.S. Cl. 350—162.13** **17 Claims**



1. A polychromatic optical correlator system, comprising:

means to generate simultaneously a plurality of electromagnetic signal beams at a plurality of wavelengths;

beam combining means to direct the signal beams along an axis to form a multicomponent, multiwavelength beam comprising said signal beams;

beam modulating image means to expose at least one view to the signal beams to spatially modulate each of the signal beams;

an optical memory element having a plurality of matched filters stored therein;

a multiple beam generating holographic lens located in the path of the multicomponent, multiwavelength beam to deflect each of the component signal beams thereof onto the optical memory element, with each of the signal beams being focused on a respective one of the matched filters of the optical memory element; and

optical detection means located in the paths of output beams of the optical memory element to produce a signal when the correlation between the pattern of one of the signal beams focused on the optical memory element and the matched filter on which said one of the beams is focused, rises above a predetermined value.

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**4,941,734**

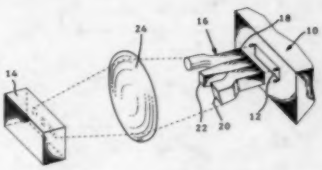
## BEAM ALLOCATION AND DELIVERY SYSTEM FOR EXCIMER LASER

**Richard T. Williams, Winston-Salem, and Jeff C. Wu, Clemmons, both of N.C., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Nov. 18, 1988, Ser. No. 273,381**

**Int. Cl.[5] G02B *27/00***

**U.S. Cl. 350—321** **4 Claims**



1. An efficient system for reshaping a fixed, generally rectangular excimer laser beam and focussing such reshaped beam onto a workpiece remote from a source of said excimer laser beam, the system comprising an excimer laser emitting a generally rectangular beam, a first end of at least one elongated fibrous or solid light-guide disposed adjacent the beam source, where the cross-section of said first end of said elongated fibrous of solid light-guide is of a first size sufficient to fully accept said rectangular beam, and a remote end of said elongated fibrous or solid light-guide is of a second size, smaller than the first size of "diamond" shaped cross-section whereby to direct said laser beam onto a workpiece disposed a distance therefrom, said beam being transmitted through said elongated fibrous or solid light-guide and reshaped from rectangular to "diamond" shaped, and focused onto said workpiece by an imaging lens.

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**4,941,735**

## OPTICALLY ADDRESSABLE SPATIAL LIGHT MODULATOR

**Garret R. Moddel, and Kirstina M. Johnson, both of Boulder, Colo., assignors to University of Colorado Foundation, Inc., Boulder, Colo.**

**Filed Mar. 2, 1989, Ser. No. 318,775**

**Int. Cl.[5] G02F *1/13***

**U.S. Cl. 350—342** **51 Claims**

1. A multi-pixel liquid crystal spatial light modulator having a plurality of picture elements, comprising;

a pair of spaced transparent electrically conductive films,

a photosensitive film carried by one of said conductive films,

a plurality of conductive elements carried by said photosensitive film and arranged to define the position of each individual one of said plurality of modulator picture elements, each individual one of said conductive elements being electrically isolated from all other conductive elements,

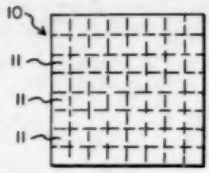
an apertured film carried by said photosensitive film substantially coplanar with said conductive elements, said apertured film having apertures formed therein and arranged in the form of the modulator picture elements, so as to define a plurality of areas of uncovered photosensitive film area, each of said uncovered areas of photosensitive film surrounding one of said conductive elements,

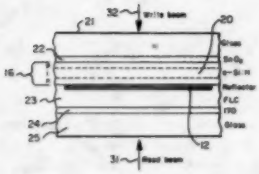
liquid crystal activating voltage source means connected to said conductive films,

chiral smectic liquid crystal means confined between said one conductive film and said photosensitive film,

write beam means selectively directable to the side of said photosensitive film opposite from said plurality of conductive elements,

whereby individual picture elements of said modulator are individually addressed by activating the portion of said





photosensitive film that is associated with said addressed picture elements,

thereby causing the corresponding conductive-element-defined chiral smectic liquid crystal picture elements to switch states, and read wavefront means directable to a side of said modulator.

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**4,941,736**

## FERROELECTRIC LIQUID CRYSTAL DEVICE AND DRIVING METHOD THEREFOR

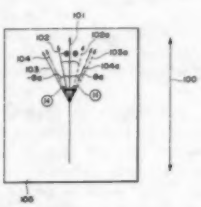
**Osamu Taniguchi, Kawasaki; Junichiro Kanbe, Yokohama; Shinjiro Okada, Kawasaki; Akira Tsuboyama, Tokyo, and Masahiko Enari, Yokohama, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation-in-part of Ser. No. 854,583, Apr. 22, 1986, abandoned, and a continuation-in-part of Ser. No. 170,109, Mar. 11, 1988, abandoned, which is a continuation of Ser. No. 28,130, Mar. 19, 1987, abandoned. This application Jul. 29, 1988, Ser. No. 225,827**

**Claims priority, application Japan, Apr. 23, 1985, 60-087084; Apr. 24, 1985, 64-087830; Apr. 24, 1985, 60-087829; Apr. 24, 1985, 64-087828; Mar. 24, 1986, 61-065054; Mar. 25, 1986, 61-067585; Aug. 25, 1987, 62-198408**

**Int. Cl.[5] G02F *1/13***

**U.S. Cl. 350—350 S** **36 Claims**



1. A ferroelectric liquid crystal device, comprising:

a pair of substrates each having a plurality of electrodes oppositely spaced from each other, the electrodes on said pair of substrates being disposed so as to intersect with each other, and a ferroelectric liquid crystal layer disposed between the substrates having a thickness which is small enough to release a helical structure of the ferroelectric liquid crystal in the absence of an electric field, wherein a pixel is at each intersection of the opposite electrodes formed on the pair of substrates and non-pixel portions are where the opposite electrodes do not face each other, wherein

the ferroelectric liquid crystal provides two average molecular axes forming an angle $2\theta$ therebetween under the application of no electric field;

the ferroelectric liquid crystal provides a first average molecular axis under application of a voltage of one polarity exceeding one threshold and a second average molecular axis under application of a voltage of the other polarity exceeding the other thereshold, said first and second average molecular axes forming an angle 2 H therebetween satisfying H $>\theta$; the ferroelectric liquid crystal at the nonpixel portions forming an orientation state providing an average molecular axis forming an angle $\theta$ or $-\theta$; the ferroelectric liquid crystal also providing a third average molecular axis after application of said voltage of one polarity exceeding the one thereshold and then under or after application of an AC voltage which is insufficient to result in said second average molecular axis and a fourth average molecular axis after application of said voltage of the other polarity exceeding the other thereshold and then under of after application of an AC voltage which is insufficient to result in said first average molecular axis, said third and fourth average molecular axes forming an angle $2\theta_a$ therebetween satisfying H $\geqq\theta_a>\theta$; and

a pair of cross nicol polarizers disposed to sandwich the ferroelectric liquid crystal layer such that the polarizing axis of one of the polarizers substantially coincides with one of said third and fourth average molecular axes.

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**4,941,737**

## LIQUID-CRYSTAL DISPLAY DEVICE USING TWISTED NEMATIC LIQUID CRYSTAL MOLECULES

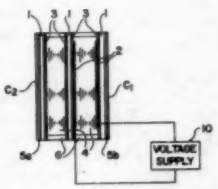
**Naofumi Kimura, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan**

**Filed Oct. 6, 1988, Ser. No. 254,042**

**Claims priority, application Japan, Oct. 7, 1987, 62-253278**

**Int. Cl.[5] G02F *1/13***

**U.S. Cl. 350—335** **18 Claims**




1. A liquid-crystal display device comprising:

a multi-layer-type liquid-crystal cell that is composed of at least first and second cell layers, said cell layers containing liquid-crystal molecules with a twisted nematic orientation therein;

said first cell layer having an angle of twist of said liquid-crystal molecules opposite to an angle of twist of the liquid-crystal molecules in said second cell layer;

said liquid-crystal molecules in said first cell layer in the vicinity of said second cell layer having a first orientation; and

said liquid-crystal molecules in said second cell layer in the vicinity of said first cell layer having a second orientation;

said first and second orientation forming an angle which varies between 70° to 80° or 110° to 150°; and

voltage-applying means, operatively connected to said first cell layer, for applying a voltage to said first cell layer to vary said first orientation of said liquid-crystal molecules;

said second orientation of said liquid-crystal molecules in said second layer cell not being varied by said voltage applying means.

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**4,941,738**

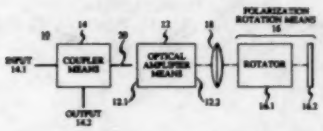
**POLARIZATION INDEPENDENT OPTICAL AMPLIFIER APPARATUS**

**Nils A. Olsson, New Providence, N.J., assignor to American Telephone and Telegraph Company, New York, N.Y.**

**Filed Jul. 29, 1988, Ser. No. 225,700**

**Int. Cl.[5] G02B *5/30***

**U.S. Cl. 350—377** **7 Claims**




1. Optical amplifier apparatus for amplifying optical radiation having arbitrary polarization, amplification being independent of said polarization, said apparatus comprising

an optical amplifier which has different gains for TE and TM modes of said optical radiation,

means for transmitting both polarizations of said radiation essentially simultaneously through said amplifier, and

means located external to any resonator for rotating both of said polarizations of said radiation by n90°, where n is an odd integer, after it emanates from said amplifier and for transmitting said polarization-rotated radiation through said amplifier again so that the gains of said TE and TM modes passing through said amplifier an even number of times are essentially equal.

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**4,941,739**

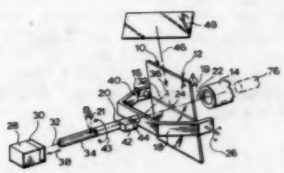
**MIRROR SCANNER**

**Gregory Z. Grudic, Richmond; Michael F. Kelly, and Peter D. Lawrence, both of Vancouver, all of Canada, assignors to University of British Columbia, Canada**

**Filed Jan. 17, 1989, Ser. No. 297,406**

**Int. Cl.[5] G02B *26/08***

**U.S. Cl. 350—486** **7 Claims**




1. A scanner comprising a mirror having a reflective surface, an optical system having a focal axis directed at an area of said reflecting surface, means for mounting said mirror to rotate about a first axis located substantially in the plane of said reflecting surface, means for rotating said mirror about said first axis, means mounting said mirror and said first axis for rotation about a second axis, said second axis being formed by a hollow shaft, said means to rotate said mirror about said first axis including a substantially non extendable cable under tension extending through said hollow shaft and connected to said mirror in a position spaced from said first axis, means for biasing said mirror to maintain tension in said cable and means for moving said connecting means substantially axially of said hollow shaft, said first axis and said second axis being substantially mutually perpendicular and intersecting, means for rotating said mirror and said first axis about said second axis, said second axis and said focal axis being substantially in axial alignment.

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**4,941,740**

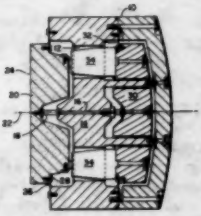
**MIRROR MOUNT WITH ANNULAR FLAT DIAPHRAGM ENCIRCLING CIRCULAR MIRROR AND INCLUDING A PLURALITY OF ACTUATORS**

**Warren R. Sigman, North Palm Beach, Fla., assignor to United Technologies Corporation, Hartford, Conn.**

**Filed Jun. 22, 1989, Ser. No. 369,804**

**Int. Cl.[5] G02B *7/18, 5/08, 26/08***

**U.S. Cl. 350—636** **10 Claims**



1. A positionally adjustable mirror arrangement, comprising:

a support body;

a circular mirror having a central axis perpendicular to the face of said mirror;

a first annular flat diaphragm completely encircling and secured to the periphery of said mirror, and secured to said support body;

a plurality of actuators for rotating said mirror around transverse axes perpendicular to said central axis, said transverse axes being substantially in the plane of said diaphragm.

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**4,941,741**

**OPHTHALMIC DISEASE DETECTION APPARATUS**

**Susumu Mizuta, Tokyo, Japan, assignor to Kowa Company, Ltd., Japan**

**Filed Jul. 7, 1988, Ser. No. 216,385**

**Claims priority, application Japan, Jul. 15, 1987, 62-174951**

**Int. Cl.[5] A61B *3/10***

**U.S. Cl. 351—221** **12 Claims**

1. An apparatus for detecting ophthalmic diseases in a patient's eye comprising:

a laser source for producing a laser beam;

a laser beam projector for projecting the laser beam;

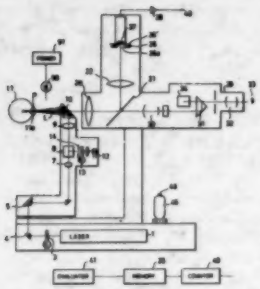
means for focusing the laser beam at a selected spot in the patient'eye;

means for receiving light scattered from the patient's eye and photoelectrically converting it into an electrical signal;

a mask disposed in the front of said photoelectric converting means and formed thereon with a slit having predetermined width to limit the scattered light that impinges on said photoelectric converting means;

light shield means for blocking the light scattered from the eye, the light shield means being disposed in the slit to be displaceable so as to shield the light scattered from the selected spot in the eye to extract noise corresponding to light other than the light scattered from the selected spot in the eye; and

means for processing the electrical signal derived from the light scattered from the eye with the noise removed there-



from to evaluate for opthalmic diseases in the patient's eye.

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**4,941,742**

**ARRANGEMENT FOR MEASURING THE CONCENTRATION OF GASEOUS AND VAPOROUS COMPONENTS OF A FLUID MIXTURE**

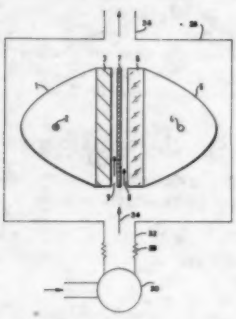
**Bernhard Schrader; Petra Heinrich, both of Essen, and Raimund Wyzgol, Dortmund, all of Fed. Rep. of Germany, assignors to Drägerwerk Aktiengesellschaft, Lübeck, Fed. Rep. of Germany**

**Filed Dec. 22, 1988, Ser. No. 288,309**

**Claims priority, application Fed. Rep. of Germany, Dec. 23, 1987, 3743684**

**Int. Cl.[5] G01N** *1/10, 21/05*

**U.S. Cl. 356—38** **7 Claims**



1. An arrangement for measuring the concentration of gaseous and/or vaporous components of a flowing fluid mixture, the arrangement comprising:

light source means for irradiating light radiation and directing the same along a predetermined light radiation path;

detecting means mounted downstream of said light source means for receiving said light radiation;

flow path means for conducting said flow of said fluid mixture through said light radiation path;

a membrane having two surfaces and being disposed in said flow path means so as to subdivide the latter into two component flow paths for conducting respective component flows of said fluid mixture over respective ones of said surfaces;

said membrane being transparent to said light radiation and being selectively permeable to particles of said components to be measured for accumulating the latter and so act upon said light radiation moving along said light radiation path;

said light source means and said detecting means being mounted adjacent corresponding ones of said surfaces of said membrane so as to conjointly define said component flow paths with said membrane and so as to cause said light radiation path to be substantially perpendicular to said membrane; and,

said membrane being mounted in said flow path means so as to be parallel to the flow of said fluid mixture.

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**4,941,743**

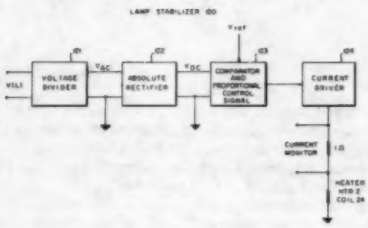
**HIGH STABILITY HIGH INTENSITY ATOMIC EMISSION LIGHT SOURCE**

**Tetsuo Hadeishi, Kensington, and Thurston Le Vay, Arcadia, both of Calif., assignors to Gruen Optik Wetzlar GmbH, Wetzlar, Fed. Rep. of Germany and Glass Instruments Inc., Pasadena, Calif.**

**Filed Oct. 7, 1988, Ser. No. 254,627**

**Int. Cl.[5] G01J** *3/443;* **H01J** *7/24, 13/32, 61/52*

**U.S. Cl. 356—311** **7 Claims**




1. Apparatus for providing a high intensity atomic emission light source comprising:

(a) a discharge lamp having a discharge region and a sample region in fluid communication with each other;

(b) at least first and second electrodes positioned within said discharge region;

(c) said discharge lamp containing a noble gas and a sample material selected from a group consisting of individual elements and halides of refractory metals;

(d) first heating means positioned for heating said discharge region;

(e) second heating means positioned for heating said sample region;

(f) means for detecting a discharge voltage across said electrodes; and

(g) means responsive to said means for detecting for controlling said heating means to control a temperature of at least one of said sample region and said discharge region so as to maintain said discharge voltage constant across said electrodes during operation of said discharge lamp,

wherein said first heating means operates to heat said discharge region to a temperature higher than that of said sample region.

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**4,941,744**

**INTEGRATED-PHOTOCIRCUIT INTERFEROMETER**

**Takashi Yokokura; Nobuo Hori; Hiroaki Shimozono, and Satoru Niimura, all of Tokyo, Japan, assignors to Tokyo Kogaku Kikai Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 6, 1988, Ser. No. 215,684**

**Claims priority, application Japan, Jul. 7, 1987, 62-167726**

**Int. Cl.[5] G01B** *9/02*

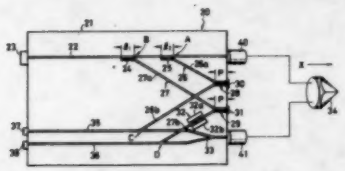
**U.S. Cl. 356—358** **8 Claims**

1. An integrated-photocircuit interferometer with a thin-walled substrate having formed therein:

an exit waveguide for directing coherent light for measurement from a light source toward an object;

an inlet waveguide having a plurality of branch waveguides for receiving said light for measurement reflected from said object and for guiding said received light through said plurality of branch waveguides to a corresponding plurality of photodetectors; and

reference waveguides optically connecting said exit wave-



guide to said branch waveguides for extracting a plurality of reference beams from the light for measurement propagating through said exit waveguide and for guiding each of said reference beams into a corresponding one of said branch waveguides, said reference waveguide providing different optical path length differences for said plurality of reference beams.

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**4,941,745**

## PROJECTION ALIGNER FOR FABRICATING SEMICONDUCTOR DEVICE HAVING PROJECTION OPTICS

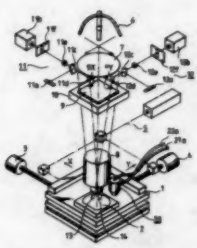
**Shuji Sugiyama, Mito, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 28, 1988, Ser. No. 291,163**

**Claims priority, application Japan, Dec. 30, 1987, 62-333186**

**Int. Cl.[5] G01B *11/00***

**U.S. Cl. 356—401** **8 Claims**



1. A projection aligner for fabricating a semiconductor device having a projection optics which projects a circuit pattern of a reticle on a wafer comprising:

an X-Y stage for mounting the wafer thereon,

a stage controller for moving the X-Y stage to an X or Y direction,

developing means for developing an alignment mark on the wafer projected by the projection optics,

an alignment mark detector set on the projection optics for detecting the alignment mark,

correction means for correcting a relative positional relation between the alignment mark detector and the projection optics by measuring an offset error with respect to a zero point of the alignment mark detector, after the alignment mark is projected on the wafer by the projection optics, is moved to the developing means so as to be developed by the developing means, is moved to a previously set position and is detected by the alignment mark detector while keeping the wafer fixedly mounted on the X-Y stage.

**4,941,746**

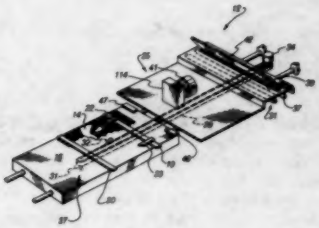
## APPARATUS FOR AUTOMATICALLY DETERMINING THE DENSITIES OF A GRAPHIC IMAGE

**Frank A. Hall, Circle Pines, Minn.; H. Brent Archer, Miami, Fla., and Curt Frederick, Blaine, Minn., assignors to Chesley F. Carlson Company, Plymouth, Minn.**

**Continuation-in-part of Ser. No. 51,270, May 4, 1987, abandoned, which is a continuation of Ser. No. 722,907, Apr. 12, 1983, abandoned. This application Dec. 14, 1987, Ser. No. 132,521**

**Int. Cl.[5] C01N *21/00***

**U.S. Cl. 356—444** **19 Claims**



1. An apparatus for automatically determining the densities of a graphic image having highlight, shadow and intermediate densities comprising:

a support means for supporting the graphic image;

a light source positioned to direct light on or through the graphic image;

a scanning head positioned adjacent the support means to measure the highlight, shadow and intermediate densities, the scanning head comprising:

a plurality of light sensitive elements positioned to detect the amount of light from the graphic image and thereby to provide data relating to the density of the graphic image; and

means for focusing the light on the plurality of light sensitive elements;

automated means for causing relative scanning movement between the scanning head and the graphic image for at least two scans, one of which measures highlight and shadow densities and another of which determines the intermediate densities;

means for calibrating the plurality of light sensitive elements;

means for correcting the data from each light sensitive element according to the calibration; and

means for processing the corrected data from each of the light sensitive elements to determine the highlight and shadow densities of the graphic image and the intermediate densities of graphic image.

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**4,941,747**

## OPTICAL SENSING ARRANGEMENTS

**John P. Dakin, Hampshire, England, assignor to Plessey Overseas Limited, Ilford, England**

**Filed Feb. 10, 1989, Ser. No. 308,521**

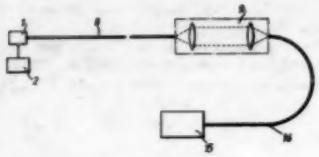
**Claims priority, application United Kingdom, Feb. 10, 1988, 8802998**

**Int. Cl.[5] G01J *3/26*; G01B *9/02***

**U.S. Cl. 356—346** **6 Claims**

1. An optical scanning arrangement for gas sensing, in which scanned light source means comprising a white or broadband light source and a frequency scanning comb filter produces a spectrum of regularly spaced wavelengths or lines which correspond as regards spacing to an absorption line spectrum or a gas to be monitored and in which a multi-line output from the light source means propagates through a region to be

sensed for gas and means for determining the light output from the sensed region for detecting attenuation of components of



the multi-line output from the light source means due to absorption by said gas being monitored.

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**4,941,748**

## EXTRUDER WITH CERAMIC PROCESSING UNIT

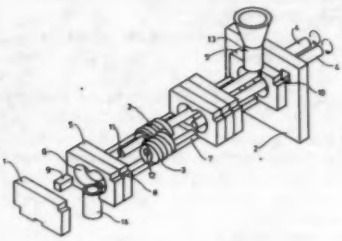
**Werner Pusch, and Martin Ullrich, both of Leverkusen, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Mar. 7, 1989, Ser. No. 320,025**

**Claims priority, application Fed. Rep. of Germany, Mar. 25, 1988, 3810079**

**Int. Cl.[5] B29C** *47/40, 47/60, 47/66*

**U.S. Cl. 366—85** **10 Claims**



1. An extruder comprising: at least one screw element mounted on a screw shaft for rotation around a longitudinal axis thereof; means forming a barrel with a reaction space therein for rotatably receiving the at least one screw element and screw shaft, wherein the means forming the barrel comprises a plurality of barrel plates, each composed entirely of ceramic material and having an aperture therein and means mounting the plates in an abutting relationship perpendicular to the longitudinal axis of the screw shaft and with the apertures aligned to define the reaction space.

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**4,941,749**

## HUB FOR AN AGITATOR HAVING HOLLOW BLADES AND AN INTERNAL HEAT-CONVEYING FLUID FLOW CIRCUIT

**Alain Bouchez, Vincennes; Patrice Cognard, Boulogne; Gérard Marie, Rueil Malmaison, and Alain Schmidt, Mesnil le Roy, all of France, assignors to Societe Anonyme: Moritz, France**

**Filed Dec. 27, 1988, Ser. No. 289,664**

**Claims priority, application France, Dec. 29, 1987, 87 18510**

**Int. Cl.[5] B01F** *7/20, 15/06;* **F28F** *5/04*

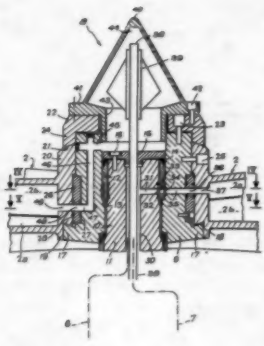
**U.S. Cl. 366—147** **10 Claims**

1. A hub for an agitator having hollow blades and an internal fluid flow circuit, the hub being of the type intended for mounting at the end of a fluted drive shaft which is connected to at least one fluid flow circuit including a go circuit and a return circuit, the hub comprising:

a fluted ring threaded onto the shaft and carrying the roots of the hollow blades;

an axial fastening liner interposed between the shaft and the ring and locked axially in position by a fluid-tight stopper fitted to the end of the shaft, which shaft delimits an axial bore in communication with the go circuit, said stopper having a tube in communication with the return circuit passing through said stopper and extending above it;

a hollow cap applied to the top of the ring in order to delimit a fluid-tight manifold chamber into which the tube opens out; and



fluid-tight fluid flow means passing firstly through the shaft, the liner, the ring, and the blade roots in order to put the blades into communication with the go circuit, and secondly the ring and the blade roots in order to put the blades into communication with the manifold chamber which itself is in communication with the return circuit via the tube.

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**4,941,750**

## MOVING AGITATOR MEMBER FOR APPARATUS FOR MIXING SUBSTANCES IN POWDER, PASTE, OR GRANULAR FORM

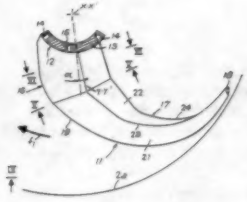
**Alain Bouchez, Vincennes; Patrice Cognard, Boulogne; Marie Geárard, Rueil Malmaison, and Alain Schmidt, Mesnil Le Roi, all of France, assignors to Societe Anonyme: Moritz, France**

**Filed Dec. 27, 1988, Ser. No. 289,681**

**Claims priority, application France, Dec. 30, 1987, 87 18546**

**Int. Cl.[5] B01F** *7/20, 15/06*

**U.S. Cl. 366—147** **5 Claims**



1. A rotating agitator member for apparatus for mixing substances in powder, paste, or granular form, of the type comprising a hub suitable for fitting to the terminal portion of a drive shaft projecting into a receptacle constituting the apparatus, said hub processing n shaped blades each having a leading edge following the corresponding inside face of the receptacle as closely as possible, with each blade comprising:

a base suitable for fixing to the hub and centered on the axis of rotation x—x' thereof;

a blade root extending from an outside face of the base along a direction which is substantially radial relative to the axis of rotation x—x '; and

a curved blade segment running on from the blade root and rising at an angle $\beta$ relative to the axis of rotation x—x', said curved blade segment sweeping rearwardly in order to present a convex leading edge in the direction or rotation of the agitator member;

wherein:

said blade segment is in the form of a half-crescent whose thickness tapers away from the blade root, a leading surface of the curved blade segment being twisted relative to a reference plane perpendicular to the axis of rotation x—x ', the blade root and the blade segment being made in the form of a hollow section member having a right cross section which is triangular in shape and which includes a bottom wall forming a bottom surface and two outer walls forming an upper surface, one of said outer walls including said leading surface and the bottom surface defining a clearance angle $\gamma$.

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**4,941,751**

## MULTI-COMPONENT MIXING CAPSULE HAVING AN EJECTION DEVICE FOR THE MIXED COMPOUND, IN PARTICULAR FOR DENTAL PURPOSES

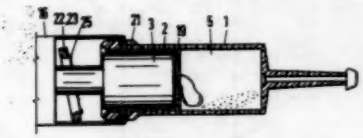
**Ernst Mühlbauer, Elbgaustr. 248, 2000 Hamburg 53, Fed. Rep. of Germany**

**Filed Jul. 14, 1989, Ser. No. 379,862**

**Claims priority, application Fed. Rep. of Germany, Jul. 18, 1988, 8809184[U]**

**Int. Cl.[5] B01F *5/06***

**U.S. Cl. 366—176** **4 Claims**



1. A capsule usable with an actuating tool, for mixing components and ejecting the resulting mixed compound, comprising:

a receptacle part (1) having a front portion forming a mixing chamber (5) with an ejection opening (7) in a front wall thereof and an open rear portion;

a hollow piston (2) which can be displaced in the receptacle part (1), the piston including a rear portion initially extending rearward of the receptacle part and having a radial projection thereon and a perforated front wall (19) defining a rear wall of the mixing chamber (5) away from the ejection opening (7), the hollow portion of the piston on the rear side of the perforated wall defining an accommodation chamber (31) for a film container (32) containing a liquid component;

a ram (3) which can be displaced in the accommodation chamber (31) by the actuating tool (16) in order to first empty the film container (32) through the perforated front wall (19) into the mixing chamber (5), and then advance the piston relative to the receptacle to eject the mixed compound;

wherein,

the piston (2) is initially supported relative to the receptacle by the projection against the tool force pushing forward the ram (3), and then is self-released from the receptacle while the tool advances the ram and piston to empty the film container, and

the projection (22, 23) is connected to the perforated wall (19) of the piston (2) via a tearable portion (25), the tear strength of which is greater than the force of the advancing ram required to empty the film container (32).

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**4,941,752**

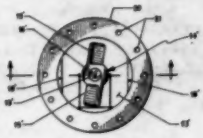
## MIXING EQUIPMENT AND METHODS

**Robert E. Yant, Medina, and Mark E. Piechuta, Akron, both of Ohio, assignors to Quantum Technologies, Inc., Twinsburg, Ohio**

**Filed Apr. 25, 1988, Ser. No. 185,456**

**Int. Cl.[5] B01F *7/04, 7/18, 15/00***

**U.S. Cl. 366—307** **20 Claims**



1. In a mixing device having a mixing chamber with a cylindrical inner wall, a multibladed agitator adapted for rotation concentrically within said chamber via a suitable drive shaft and a plurality of equally spaced, elongated baffles coaxially extending along the inner wall of said chamber for the major portion of its length, the improvement which comprises each of said baffles having a uniform cross-sectional shape corresponding generally to a small geometric segment of a circle, the radius of which is substantially the same as that of the inner wall of said chamber, with the rounded, substantially cylindrical surface of each baffle fitted against the inner wall of said chamber and with the flat sides of said baffles facing inwardly.

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**4,941,753**

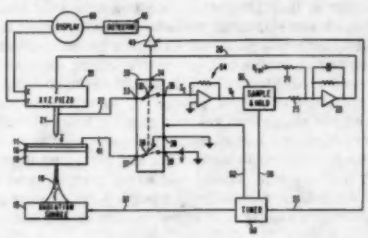
## ABSORPTION MICROSCOPY AND/OR SPECTROSCOPY WITH SCANNING TUNNELING MICROSCOPY CONTROL

**Hemantha K. Wickramasinghe, Chappaqua, N.Y., assignor to International Business Machines Corp., Armonk, N.Y.**

**Filed Apr. 7, 1989, Ser. No. 334,833**

**Int. Cl.[5] G01K *1/16*; G01N *25/00***

**U.S. Cl. 374—120** **22 Claims**



1. Apparatus for absorption measurements comprising:

a sample with a conductive surface,

means for supporting said sample for measurement,

means for directing energy onto said sample to cause local heating of the sample,

a thermal measurement tip,

support means for maintaining said thermal measurement tip within about 10 A° of said conductive surface, and

measurement means coupled to said thermal measurement tip for measuring a junction potential between said thermal measurement tip and said conductive surface.

10. A method or effecting absorption measurements comprising:

(a) supporting a sample with a conductive surface for measurement,
(b) directing energy onto said sample to cause local heating of the sample,
(c) supporting a thermal measurement tip sufficiently close to said conductive surface to equalize Fermi levels between said tip and surface, and
(d) measuring a junction potential between said thermal measurement tip and said conductive surface.

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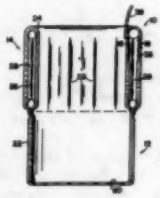
**4,941,754**
**INFLATABLE SELF-SUPPORTING BAG**
**Paul Murdock, 168 Elm St., Windsor Locks, Conn. 06096**
**Filed May 26, 1989, Ser. No. 358,121**
**Int. Cl.[5] B65D *33/00***
**U.S. Cl. 383—3** **8 Claims**



1. A collapsed inflatable self-supporting bag comprising a substantially flat generally rectangular structure defined by a plurality of generally rectangular sheet material panels, each of said panels being connected in face-to-face relation to another of said panels, said structure having a lower portion formed from a single ply of sheet material and including two substantially rectangular panels connected together in face-to-face relation along bottom and side marginal edge portions thereof defining a bag bottom and a portion of a bag sidewall, and an inflatable upper portion contiguous to said lower portion and formed by a plurality of generally rectangular air impervious sheet material panels defining two plies including an inner ply and an outer ply, said upper portion defining the remaining portion of said sidewall and a mouth opening at the upper end thereof, said inner ply and said outer ply cooperating to define an air chamber therebetween, connecting means for attaching said inner ply and said outer ply in face-to-face relation to each other along generally parallel lines of attachment to divide said chamber into a plurality of intercommunicating sections inflating means for introducing air into said chamber to inflate said upper portion, said upper portion in its inflated condition having a generally cylindrical configuration being defined by a plurality of intercommunicating elongate tubular portions immediately adjacent to each other and extending in parallel relation to the central axis of said upper portion, said lower portion depending from said upper portion, and closure means for releasably retaining said upper portion in inflated condition.

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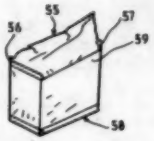
**4,941,755**
**DEVICE FOR MANUFACTURING A CONTAINER OF FLEXIBLE SYNTHETIC MATERIAL**
**Michel Cazes, Vittel, France, assignor to Societe Generale Des Eaux Minerales De Vittel, Vittel, France**
**Filed Feb. 19, 1988, Ser. No. 158,307**
**Int. Cl.[5] B65D *30/16***
**U.S. Cl. 383—119** **13 Claims**

1. A sachet of flexible synthetic material comprising:
a flexible body for containing a liquid; and
means for receiving and supporting the flexible body comprising one or more side reinforcing pieces connected at a base to form a bottom portion and a sleeve for engaging the side reinforcing pieces to define a container for receiving the flexible body;



wherein the flexible body is frictionally contained within the receiving and supporting means and wherein said friction is the only means for retaining the flexible body within the receiving and supporting means.

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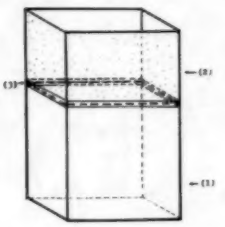
**4,941,756**
**DISPOSABLE BAG WITH ATTACHED NAPKIN**
**John S. Price, 28 Lauretta Dr., Highland, N.Y. 12528, assignor to John Sterling Price, Highland, N.Y.**
**Filed Apr. 3, 1989, Ser. No. 331,831**
**Int. Cl.[5] B65D *30/02, 30/10***
**U.S. Cl. 383—127** **4 Claims**



1. A bag of flexible material comprising:
an open bag mouth;
at least one napkin of absorbent material wherein said at least one napkin is releasably connected to the bag about the open bag mouth by adhering means such that the connection defines an overlapping seam.

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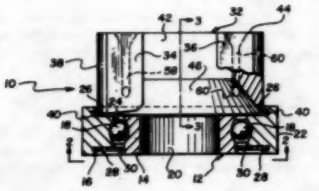
**4,941,757**
**GREASE RESERVOIR**
**David F. Hall, Naples, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**
**Filed Jul. 31, 1989, Ser. No. 387,192**
**Int. Cl.[5] F16C *33/66***
**U.S. Cl. 384—473** **4 Claims**



1. A grease reservoir for use with a bearing having (1) an inner race, (2) an outer race radially outward of the inner race, and (3) a generally circular groove in the outer race facing the

inner race and located at an end portion of the outer race, the reservoir comprising:

means defining a flexible arcuate reservoir member having spaced ends and a generally cylindrical outer surface extending from one end to the other end, a flange projecting radially outwardly from one side edge of the outer surface, the flange being dimensioned relative to the groove in the bearing so that the flange can be positioned within the groove to attach the member to the bearing, the member being sufficiently flexible so that it can be flexed to position the flange in the groove and to remove the flange from the groove, and a passageway extending through the reservoir member in an axial direction so that grease can be forced into and through the passageway to the bearing when the member is attached fto the bearing.

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**4,941,758**

## LINEAR SLIDING GUIDE BEARING

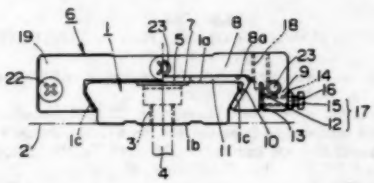
**Nobuyuki Osawa, Takasaki, Japan, assignor to Nippon Seiko Kabushiki Kaisha, Tokyo, Japan**

**Filed Jul. 11, 1989, Ser. No. 378,134**

**Claims priority, application Japan, Jul. 29, 1988, 63-100856[U]**

**Int. Cl.[5] F16C *29/12***

**U.S. Cl. 384—40** **3 Claims**




1. A linear sliding guide bearing comprising:

an axially extending guide rail including both sliding side surfaces slanting and expanding upwardly and outwardly from both edges of a bottom surface which is fixed to a base, said guide rail including a plurality of fixing bolt holes penetrating from an upper surface to the bottom and spaced at predetermined intervals along an axis line;

a slider loosely and slidably fitted onto said guide rail and including both side walls having inner surfaces slanting inversely and opposed to the slanting side surfaces of the guide rail with a gap therebetween, said slider including an upper plate portion having an inner surface opposed to the upper surface of said guide rail with a gap therebetween;

a sliding member formed of a thin plastic plate and bonded to the inner surface of the upper plate portion and to the inner surface of both the side walls to fill the gap therebetween;

at least one of the side walls being formed with a slit extending vertically from a bottom surface of the side wall to reach near an upper base portion of the inversely slanted inner surface, said slit also extending axially in parallel to the outer side surface of the side wall; and

pressing means provided on said one of the side walls for pressing a slit surface of the slit to elastically deform the inversely slanted inner surface towards the sliding side surface of said guide rail.

**4,941,759**

## COMB SEPARATOR FOR BALL BEARINGS

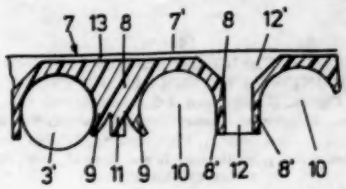
**Peter Dreschmann, Dittelbrunn, and Horst Gutsche, Schweinfurt, both of Fed. Rep. of Germany, assignors to FAG Kugelgischer Georg Schafer (KGaA), Fed. Rep. of Germany**

**Filed Jun. 22, 1989, Ser. No. 370,237**

**Claims priority, application Fed. Rep. of Germany, Jun. 27, 1988, 3821613**

**Int. Cl.[5] F16C *33/38, 33/44***

**U.S. Cl. 384—531** **8 Claims**




1. A generally comb shaped annular separator for use in ball bearings comprising:

an annular ring at a first axial side of the separator; the separator having a second axial side away from the first side for receiving bearing balls therein, and the separator having generally axially extending arms on the second axial side and spaced circumferentially around the separator for defining pockets for receiving bearing balls between circumferentially neighboring pairs of the arms; first ones of the arms alternating with second ones of the arms circumferentially around the separator;

the first arms each having two holding lips defined on them, with a respective one of the holding lips defined on the first arm for engaging behind each of the balls at that first arm, and the respective lip supporting the bearing ball in the respective pocket defined between that first arm and the neighboring second arm for holding the balls in the respective pockets;

each first arm further having a projection therefrom extending generally axially toward the second axial side, and the projection being circumferentially next to without interfering with movement of the respective lips defined on the respective first arm;

passage openings for entrance of lubricant axially extending through at least some of the second arms from the first axial side at the ring of the separator to the second axial side at the ends of the arms.

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**4,941,760**

## BALL BEARING TYPE TURBOCHARGER ROTOR ASSEMBLY

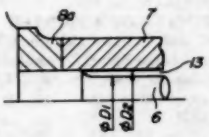
**Osamu Suzuki, and Noboru Ishida, both of Aichi, all of Japan, assignors to NGK Spark Plug Co., Ltd., Nagoya, Japan**

**Filed Sep. 12, 1989, Ser. No. 406,103**

**Claims priority, application Japan, Sep. 12, 1988, 63-227934**

**Int. Cl.[5] F16C *19/04***

**U.S. Cl. 384—537** **5 Claims**




1. A rotor assembly for a turbocharger comprising:

a rotor shaft having a shoulder at one end;

an inner ring of a ball bearing installed on said rotor shaft; and

a tubular spacer installed on said rotor shaft and secured to same by press fitting;

said tubular spacer having an end face which cooperates with said shoulder of said rotor shaft to hold therebetween said inner ring;

said spacer being constructed so that a perpendicularity of said end face relative to a center axis of said spacer is equal to or smaller than 0.1% of an inner diameter of said spacer.

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**4,941,761**

## PRINTING DEVICE CAPABLE OF LOW-DENSITY PRINTING AND HIGH-DENSITY PRINTING

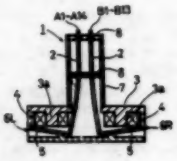
**Hiroo Ogawa, Nagoya, and Takamitsu Kawai, Obu, both of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan**

**Filed May 31, 1989, Ser. No. 359,710**

**Claims priority, application Japan, Jun. 13, 1988, 63-145020**

**Int. Cl.[5] B41J *3/12***

**U.S. Cl. 400—124** **7 Claims**



1. A printing device comprising:

a printing head having a plurality of printing elements arranged in first and second parallel but noncolinear rows and in a staggered manner which prints characters as the printhead scans a printline;

first printing control means for allocating print data to some of said printing elements in said first row spaced at regular intervals, one or more of said printing elements being located in each of said intervals, and for allocating said print data also to some of said printing elements in said second row spaced at regular intervals, one or more of said printing elements being located in each of said intervals, wherein any one of said printing elements allocated in said second row is located at a position intermediate of the adjacent ones of said printing elements allocated in said first row, whereby low-density printing is effected by said printing elements allocated by said first printing control means;

second printing control means for allocating said print data to all of said printing elements in said first and second rows, whereby high-density printing is effected by said printing elements allocated by said second printing control means with the rows in the same orientation relative to the printline as in the low-density mode; and

selecting means for selecting either of said first printing control means or said second printing control means.

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**4,941,762**

## SWITCHING MECHANISM FOR A PAPER HOLDING ROLLER OF A PRINTER

**Kenjiro Murakami, and Yukihiro Uchiyama, both of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**

**Filed Jan. 27, 1989, Ser. No. 302,653**

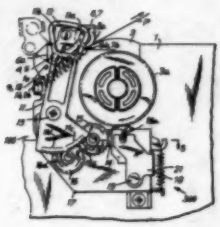
**Claims priority, application Japan, Jan. 28, 1988, 63-18116; Jan. 28, 1988, 63-18117**

**Int. Cl.[5] B41J *13/02***

**U.S. Cl. 400—636.1** **19 Claims**

1. In a printer including a frame, a platen rotatably mounted on the frame, a platen power source coupled to the platen for rotating the platen, and an apparatus for selectively moving a print paper holding member between a contact position holding a print paper against the platen and a separation position away from the platen, the improvement which comprises:

paper holding means including the paper holding member and power transmission means for selectively transmitting power from the platen power source to the paper holding means to move the paper holding member between the contact and separation positions, the power transmission



means including trigger means selectively displaceable between a first disengaged position in which the platen power source is not engaged with the paper holding means and a second engaged position in which the platen power source is operatively engaged with the paper holding means for selectively displacing the paper holding means and paper holding member from the separation position to the contact position or from the contact position to the separation position.

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**4,941,763**

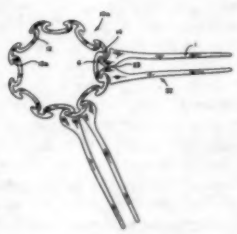
## GROOVED SUPPORT COLUMN HAVING ADAPTABLE CONNECTORS

**Vaughan O. Eutenauer, Dallas, Tex., assignor to MPS Industries, Inc., Arlington, Tex.**

**Continuation of Ser. No. 113,390, Oct. 22, 1987, abandoned, which is a continuation-in-part of Ser. No. 871,241, Jun. 6, 1986, abandoned. This application Nov. 28, 1988, Ser. No. 277,404**

**Int. Cl.[5] F16D *1/00***

**U.S. Cl. 403—3** **5 Claims**



1. A structural apparatus, comprising:

a support column having a plurality of longitudinal grooves, said grooves comprising opposing lips and facing lips;

a connector attachable to said support column, comprising:

a jaw having a hook-shaped tongue for engaging one of said lips;

an elongate flange extending from said jaw;

an outer cam surface between said jaw and said flange;

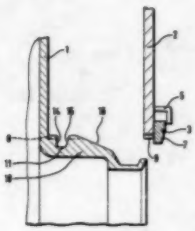
wherein said tongues of a pair of said connectors are adapted for engaging said opposing lips as said flanges are drawn together and, alternatively, for engaging said facing lips so that said cam surfaces are in abutting contact as said flanges are drawn together, thereby attaching said connectors to said support column.

4,941,764

## ARRANGEMENT FOR FASTENING A BRAKE BOOSTER

Karl Breitwieser, Reinheim, and Wolfgang Kirchner, Eschborn, both of Fed. Rep. of Germany, assignors to Alfred Teves GmbH, Frankfurt am Main, Fed. Rep. of Germany

Filed Sep. 7, 1989, Ser. No. 404,158
Claims priority, application Fed. Rep. of Germany, Sep. 15, 1988, 3831379
Int. Cl.[5] F16B *1/00*
U.S. Cl. 403—24 13 Claims



1. An arrangement for fastening a brake booster to an automotive vehicle having a splash wall by means of a disconnectable junction, the booster housing of said brake booster having a central guiding portion which passes through an opening provided in a splash wall of the automotive vehicle, wherein the guiding portion (10) is provided with an annular groove (11) receiving a clamping ring (3) held on the splash wall (2).

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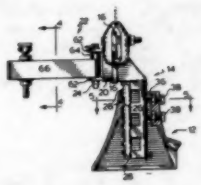
4,941,765

## ADJUSTABLE HEIGHT CLAMPING STAND

Gerald P. Horan, Markham; John T. Wickmann, Omemee, and Richard C. Olak, Peterborough, Canada, assignors to Chart Industries, Ltd., Ontario, Canada

Filed Apr. 19, 1988, Ser. No. 183,595
Claims priority, application Canada, Dec. 17, 1987, 554660
Int. Cl.[5] F16B *7/10*; B21D *1/12*
U.S. Cl. 403—107 18 Claims



1. A clamping system for securing a body in supported relation at a predetermined height, having clamp means for attachment to the body in gripping, supporting relation therewith, and clamp support means secured to said clamp means, including variable height pedestal means having an open base member and a ram member secured in height adjustable relation thereto;

said base member having a first, upwardly extending inner face bounded laterally at the sides thereof by first side wall portions extending therefrom in mutual, laterally divergent relation;

said first face having laterally extending first tooth means projecting inwardly within the base member towards the ram member;

said ram member having a second face in substantially parallel, facing relation with said first face of the base member;

second tooth means extending from said second face towards said first face, in use to engage said first tooth means in load transfer relation therewith;

threaded locking means releasably securing said ram member in laterally stabilized, friction engaging relation with said first divergent side wall portions, and positioning said first and said second tooth means in mutual engaging relation, wherein said ram member is laterally restrained by said base member divergent side wall portions in a substantially centered jamming relation with said base member.

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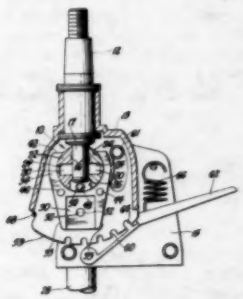
4,941,766

## TILT WHEEL UNIVERSAL

John Carlson, Wayne, Pa., assignor to Teleflex Incorporated, Limerick, Pa.

Continuation of Ser. No. 943,500, Dec. 19, 1986, abandoned.
This application Sep. 2, 1988, Ser. No. 240,439
Int. Cl.[5] F16D *3/16*; B62D *1/18*
U.S. Cl. 403—131 16 Claims



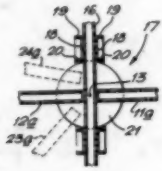
1. A universal joint (10) for use in a steering wheel assembly (10), said assembly (10) comprising; a first shaft (12) having a first universal end (14), a second shaft (28) having a second universal end (30), said first universal end (14) including oppositely disposed faces (16) with a pin (20) extending from each of said faces (16), cap members (22) rotatably disposed on said pin (20) and in facing relationship to said faces (16) for allowing relative rotational movement about the axis of said pin (20) between said first shaft (12) and said cap members (22), each of said cap members (22) having a semi-circular periphery away from said faces (16) in the plane containing the axis of said pin (20) and including flat sides perpendicular to said faces (16) extending between said faces (16) and said semicircular peripheries, and socket members (34) clamped about said second universal end (30) of said second shaft (28) and including a circular pocket (36) disposed about said cap members (22) having flat bottoms (38) in sliding engagement with said flat sides of said cap member (22) for limiting movement of said cap members (22) in said plane relative to said socket members (34) so that universal movement occurs between said shafts (12, 28) as said circular cap members (22) rotate in said pocket (36) along with said pin (20) and relative rotation occurs about the axis of said pin (20) between said first shaft (12) and said cap members (22) at said faces (16), a fastener (50) connected between said socket members (34) within said pocket (36), and said cap members (22) having said semi-circular periphery extending beyond said first universal end (14) and including reliefs (26) extending away from said first universal end (14) therein for defining a clearance about said fastener (50) for allowing rotational movement of said cap members (22).

4,941,767

## JOINTS AND STRUCTURES INCORPORATING SAME

John E. Kidd, Shorwell, England, assignor to Westland Aerostructures Limited, Yeovil, England

Filed Dec. 22, 1989, Ser. No. 454,994
Claims priority, application United Kingdom, Dec. 22, 1988, 8829995
Int. Cl.[5] F16B 1/00; F16D 1/00
U.S. Cl. 403—218 9 Claims




1. A joint for joining structural members extending in at least two intersecting planes comprises a pair of outer spaced-apart annular plate members located parallel to a first one of said intersecting planes for sandwiching structural members extending in that plane, a pair of spaced-apart inner plate members located within said annular plate members and parallel to another of said intersecting planes for sandwiching structural members extending in said another plane, and attachment means for attaching said inner plate members to said outer annular plate members.

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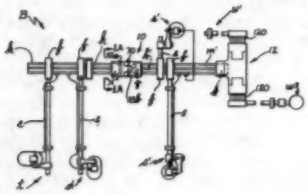
4,941,768

## QUICK DISCONNECT DEVICE

Timothy R. Arendt, South Euclid, Ohio, assignor to K & A Tool Company, Cleveland, Ohio

Filed Nov. 2, 1988, Ser. No. 266,375
Int. Cl.[5] B25G 3/00
U.S. Cl. 403—331 4 Claims



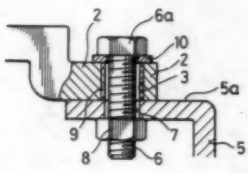
1. A quick, disconnect coupling device for releasably connecting a work station having working tools and the like to a boom arm for locating said work station along an assembly line or the like, said quick disconnect device comprising; a plurality of first coupling parts and means to releasably connect each said first coupling part to the boom arm, projection means on each said first coupling part, a second coupling part, a plurality of recess means on said second coupling part each of which nestably receives a projection means of a first coupling part to enable a plurality of first coupling parts to be nestably releasably connected to the second coupling part, and means for releasably locking said parts in said nested relation and means for releasably attaching tools and the like to said second coupling part at said work station.

4,941,769

## STRUCTURE FOR FASTENING A RESIN MEMBER WITH A THREADED BOLT

Yoshihisa Natsume, Shizuoka, Japan, assignor to Yazaki Corporation, Japan

Filed Apr. 4, 1989, Ser. No. 333,001
Claims priority, application Japan, Apr. 5, 1988, 63-45250[U]
Int. Cl.[5] F16B 17/00
U.S. Cl. 403—408.1 10 Claims




1. A structure for fastening a resin member having a hole with a certain length to another member having a hole with a threaded bolt which is passed through the holes provided in the members, comprising:

a metallic sleeve through which the bolt is to be passed, said metallic sleeve having a longitudinal end being fitted into said hole provided in said resin member for preventing damage from being caused in the resin member by an excessive tightening force of the bolt; and

the length of said sleeve being slightly shorter than the length of said hole of said resin member such that a part of the resin member can be deformed over the longitudinal end of the sleeve when excessive tightening force is applied to the resin member whereby uncontrolled deformation of the resin member is avoided.

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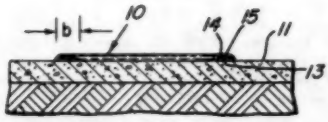
4,941,770

## METHOD FOR APPLYING A CONDUCTOR LAYER ON A ROAD SURFACE AND ARRANGEMENT OF A HEATING LAYER ON A ROAD SURFACE

Hans-Jürgen Gemmer, Amngelstr. 14, D-6251 Heistenbach, Fed. Rep. of Germany

PCT No. PCT/DE86/00436, § 371 Date Jun. 20, 1988, § 102(e) Date Jun. 20, 1988, PCT Pub. No. WO88/03303, PCT Pub. Date May 5, 1988
PCT Filed Oct. 31, 1986, Ser. No. 221,256
Int. Cl.[5] E01C 3/06, 7/28, 11/24
U.S. Cl. 404—72 3 Claims



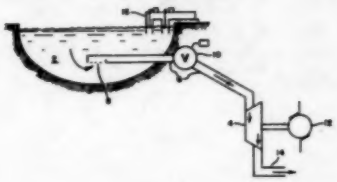

1. Method for applying an inductive conductor layer on a road surface, the conductor layer being enclosed by a protective covering, the method comprising cleaning the road surface, liquifying an electrically conductive material (15) by means of a metal spraying device and applying the conductive material directly to the previously roughened road surface (11) in a film-like manner, resulting in the conductor layer (15), sealing the conductor layer with a protective covering (14) consisting of a fast-setting plastics material which is resistant to temperature, abrasion and aggressive substances and remains elastic within certain limits.

4,941,771

## HYDROELECTRIC PLANT

Robert Perper, R.D. #2, Hillsdale, N.Y. 12529

Filed Sep. 6, 1989, Ser. No. 403,617
Int. Cl.[5] E02B 9/00
U.S. Cl. 405—78 8 Claims



1. A hydroelectric system comprising:

a water-powered turbine having a water inlet and a water outlet,

an electrical generator operatively connected to said turbine,

a float valve system comprising a level sensing means for sensing the water level in a body of water which feeds the water inlet, and a flow control means mounted in said water inlet and operatively connected to said level sensing means for controlling the flow of water through the water inlet,

whereby said level sensing means comprises a float means movably mounted on a foundation and located to rise and fall with the level of said body of water, an electrical switch means operatively connected to said float means and to said flow control means whereby when the level of the body of water rises to a predetermined height, the float means activates the switch means and the switch means sends a signal to the flow control means which causes it to allow water to flow to the turbine by fully opening and staying open until the level of the body of water falls to a predetermined level at which point the float means again activates the switch means which causes the flow control means to fully close thereby stopping the water flow to the turbine.

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4,941,772

## METHOD OF DISPOSING OF SALT-CONTAINING DUSTS FROM INCINERATOR PLANTS

Werner Roesky, Overath; Dieter Deffner, Bergisch Gladbach, and Manfred Wolter, Leverkusen, all of Fed. Rep. of Germany, assignors to Sante Corporation, Largo, Fla.

Filed Apr. 18, 1989, Ser. No. 339,711
Int. Cl.[5] B09B 3/00
U.S. Cl. 405—128 35 Claims

1. A method of disposing of salt-containing dusts from incinerator plants, comprising the steps of

mixing salt-containing dusts with water and other waste materials,

the waste materials comprising at least one of,

ash and fly ash from thermal plants fired with lignite coal or hard coal,

silica containing sands, in particular waste materials of foundaries containing quartz sands, or from waste rubble, or p2 waste materials from calcium carbide production,

the mixture containing at least 8 % hydrothermally reactive calcium oxide or quivalent amounts of other hydrothermally reactive calcium compounds compacting the mixture into discrete compacts wherein

the volume of the mixture is reduced by by compaction to at least approximately 50 % of the original volume; and

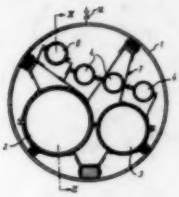
hardening the discrete compacts in an autoclave by saturated steam with a pressure of at least 1 bar to form stable compacts.

4,941,773

## METHOD FOR THERMAL INSULATION OF PIPELINE BUNDLES UNDER WATER AND PIPELINES INSULATED IN THIS WAY

Theodorus C. M. Vergouw, Schoonhoven, Netherlands, assignor to Smit Offshore Contractors BV, Rotterdam, Netherlands

Filed Apr. 5, 1989, Ser. No. 333,467
Claims priority, application Netherlands, Apr. 7, 1988, 8800894
Int. Cl.[5] F16L 1/04
U.S. Cl. 405—157 8 Claims



1. Method for application, in subsea pipeline bundles for transport of fluid or gaseous minerals in between one or more gas or fluid conducting lines and a carrier pipe surrounding them, of a thermal insulation filling characterized in that on or near the destined location a crude oil fraction that can be gelled with gelling chemicals suited for viscosifying the crude oil fraction, is pumped with such chemicals into the space to be insulated of the bundle and a variably pressurized gas is introduced to said gel to maintain said gel at a constant pressure sufficient to prevent collapse of said carrier pipe from the pressure of the surrounding seawater on said bundle after lowering said bundles into a subsea environment as a result of the expansion and contraction of said gel, wherein sufficient gelling chemicals are added such that after gellation, the dynamic viscosity of the gel is between 10 and 1000 Pa.S.

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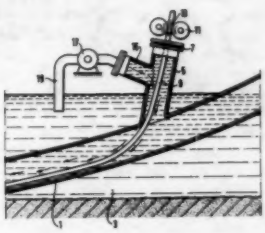
4,941,774

## METHOD AND AN APPARATUS FOR MOVING A ROPE- OR CABLE-LIKE ELEMENT THROUGH A CABLE CHANNEL PIPE

Rudolf Harmstorf, Kosterbergstrasse 40 F, 2000 Hamburg 55, Fed. Rep. of Germany, assignor to Rudolf Harmstorf, Hamburg, Fed. Rep. of Germany

Filed Oct. 15, 1987, Ser. No. 108,908
Claims priority, application Fed. Rep. of Germany, Oct. 15, 1986, 3635041
Int. Cl.[5] F16L 1/04
U.S. Cl. 405—158 15 Claims



1. Method for conveying a cable through a cable channel pipe, comprising the steps of at least partially submerging the pipe in a body of water, effecting a continuous flow of water through the pipe, affixing one or more buoyant guiding mem-

bers to the cable to buoy the cable in the flow of water, and conveying the cable along the length of the pipe by friction between the effected water flow and the cable.

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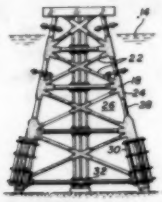
**4,941,775**

**CATHODIC PROTECTION OF CRITICAL OFFSHORE MARINE STRUCTURE CRITICAL COMPONENTS BY MAKING THE CRITICAL COMPONENT NOBLE (PASSIVE) TO THE BALANCE OF THE PLATFORM**

**Risque L. Benedict, 1528 Tioga Trail, Fallbrook, Calif. 92028**

**Filed Feb. 26, 1988, Ser. No. 161,159**
**Int. Cl.[5] E02B *17/00*; E02D *5/60, 9/00*; C23F *11/00***
**U.S. Cl. 405—216** **85 Claims**




1. A corrosion protection system for protecting critical parts of an offshore structure wherein the structure is composed of an assembly of critical parts representing a small portion of the structure and noncritical parts representing a large portion of the structure, including

means for coating the critical parts with a layer of material having a composition to form a noble or passifying protective treatment so that the critical parts are made electrochemically noble or passive relative to the uncoated noncritical parts when the offshore structure is submerged, and

the noncritical parts being electrochemically active relative to the coated critical parts to provide for cathodic protection current supplied to the coated critical parts by the uncoated active parts to produce corrosion protection to the coated critical parts.

32. A method of providing corrosion protection for critical parts of an offshore structure wherein the structure is composed of an assembly of critical parts representing a small portion of the structure and noncritical parts representing a large portion of the structure, including the following steps:

coating the critical parts with a layer of material having a composition to form a noble or passifying protective treatment so that the critical parts are made electrochemically noble or passive relative to the uncoated noncritical parts when the offshore structure is submerged, and

submerging the offshore structure to have the noncritical parts become electrochemically active relative to the coated critical parts to provide for cathodic protection current supplied to the coated critical parts by the uncoated active parts to produce corrosion protection to the coated critical parts.

69. An accelerated corrosion system for destroying critical parts of an offshore structure wherein the structure is composed of an assembly of critical parts representing a small portion of the structure and noncritical parts representing a large portion of the structure, including

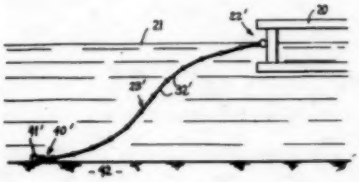
means for coating particular areas of the critical parts with a layer of conductive material and with the layer including a slit to provide for a high cathode to anode ratio between the area of the layer relative to the area of the slit to produce a rapid and deep corrosive groove at the particular areas of the critical parts to provide for accelerated corrosion at a desired time to produce destruction of the offshore structure.

**4,941,776**

**CATENARY ANCHORAGE LINE FOR A FLOATING VEHICLE AND DEVICE AND METHOD FOR USING THIS ANCHORAGE LINE**

**Jean-Michel Bosgiraud, Paris, and Andre Cendre, Cosne Sur Loire, both of France, assignors to Seamet International, Paris and S.M.F. International, Cosne Sur Loire, both of, France**

**Filed Sep. 12, 1988, Ser. No. 243,266**
**Claims priority, application France, Sep. 10, 1987, 87 12565**
**Int. Cl.[5] B63B *21/38***
**U.S. Cl. 405—224** **11 Claims**




1. A catenary anchorage line for a floating vehicle, the catenary anchorage line comprising a large number of successive articulatingly connected watertight tubular means closed at each end thereof and delimiting an interior volume filled with air, the anchorage line terminating at a first end at a shallow depth for linkage with the floating vehicle and a second end at a greater depth than said first end for insuring anchorage on a sea bottom, wherein a buoyancy of the anchorage line varies according to a length thereof, with the tubular means having a larger wall thickness relative to a diameter thereof then a wall thickness of the tubular means closer to the first end of the anchorage line.

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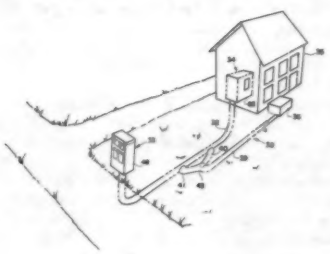
**4,941,777**

**APPARATUS FOR CONVEYING MATERIAL**

**John P. Kieronski, Charlotte, N.C., assignor to Home Courier Corporation, Concord, N.C.**

**Continuation-in-part of Ser. No. 876, Jan. 6, 1987, abandoned. This application Nov. 16, 1988, Ser. No. 272,106**
**Int. Cl.[5] B65E *51/20, 51/32***
**U.S. Cl. 406—13** **40 Claims**



1. An apparatus for propelling a carrier member along a pneumatic conveyor tube between two spaced-apart terminals, comprising:

(a) a blower having a suction intake and a blower output;

(b) conduit means interconnecting said blower to the pneumatic tube at two spaced-apart junctions therein;

(c) means for sensing the presence of said carrier member in said pneumatic tube intermediate said spaced-apart junctions;

(d) first valve means alternatively connecting said blower intake and output through said conduit means to said tube for alternatively creating carrier member propelling suction through one of said junctions through the tube past said other junction and creating carrier member propelling pressure in said tube through the other junction upon said sensing means sensing the presence of the carrier member in the tube intermediate said junctions for propelling said carrier member to one of said terminals; and

(e) second valve means in said conduit means for reversing the connection of said blower intake and output to said junctions for propelling said carrier member from said one terminal to the other of said terminals.

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**4,941,778**

## METHOD AND APPARATUS FOR MEASURING AND REGULATING THE FLOW RATE OF POWDER IN A POWDER SPRAYING DEVICE

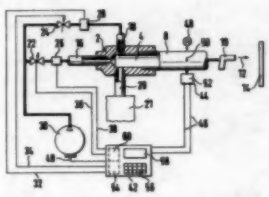
**Robert Lehmann, St. Gallen, Switzerland, assignor to Ransburg-Gema AG, Switzerland**

**Filed Jul. 1, 1988, Ser. No. 214,206**

**Claims priority, application Fed. Rep. of Germany, Jul. 2, 1987, 3721875**

**Int. Cl.[5] B65G *51/02***

**U.S. Cl. 406—28** **23 Claims**



1. A method for determining the flow rate of powder in a spraying device having a gas inlet, a powder inlet, and a channel through which the powder and gas admixed with one another are conveyed, the method comprising the steps of:

directing a beam transversely to a powder/gas flow direction in the channel, receiving a beam that had been subjected to the influence of the powder in the channel, and deriving from the received beam a powder density value indicative of the powder density of the powder in the channel;

generating a first signal representative of the power density value, in which the power density value is equal to A wherein:

$$A = \frac{\text{amount of powder}}{\text{amount of gas}};$$

determining the flow rate of a gas entering through the gas inlet and generating a gas flow rate value indicative of the flow rate of the gas;

generating a second signal representative of the gas flow rate value, wherein the gas flow rate value is represented by B wherein:

$$B = \frac{\text{amount of gas}}{\text{unit of time}};$$

calculating, from the powder density value A and from the gas flow rate value B, a powder flow rate value C indicative of the flow rate of the powder in the channel, by multiplying the power density value A by the gas flow rate value B; and

generating a third signal indicative of the power flow rate value C defined as:

$$C = \frac{\text{amount of powder}}{\text{unit of time}}.$$

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**4,941,779**

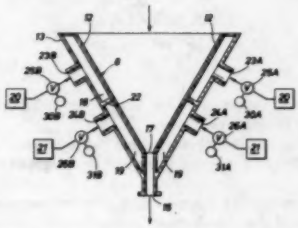
## COMPARTMENTED GAS INJECTION DEVICE

**Thomas S. Dewitz, Houston; James A. Salter, Katy; James J. McCusker, Houston, all of Tex.; Andrew M. Scott, and Hendricus A. Dirkse, both of Amsterdam, Netherlands, assignors to Shell Oil Company, Houston, Tex.**

**Continuation of Ser. No. 98,161, Sep. 18, 1987, abandoned. This application May 18, 1989, Ser. No. 355,860**

**Int. Cl.[5] B65G *53/38***

**U.S. Cl. 406—138** **22 Claims**



1. A method for maintaining a uniform mass flow rate of a particulate solids and gas mixture discharged from a holding vessel apparatus to a receiving reactor, said method comprising:

introducing said mixture into a first containing means having converging walls forming a portion made of porous material having at least one port formed at the apex thereof for discharging said mixture therefrom;

isolating areas outside the porous material portion of said first containing means to form at least two substantially closed compartments;

selectively injecting gaseous fluid under pressure into each of said compartments;

independently controlling the flow rate and direction of said gaseous fluid under pressure at a rate sufficient to aerate the particulate solids in proximity to said portion of porous material but at a rate below that which would fluidize the particulate solids located above said porous material; and

discharging said particulate solids and gas mixture from said first containing means through a conduit having a diameter in the range of about 4–150 millimeters and wherein the suspension density of said solids and gas mixture is in the range of about 50–800 kilograms per cubic meter.

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**4,941,780**

## INDEXABLE CUTTING INSERT

**Nobuhiro Takahashi, Hyogo, Japan, assignor to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Nov. 16, 1988, Ser. No. 271,669**

**Claims priority, application Japan, Nov. 24, 1987, 62-177638[U]; Jun. 20, 1988, 63-80642[U]**

**Int. Cl.[5] B23B *27/22***

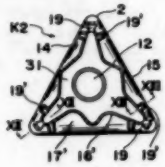
**U.S. Cl. 407—114** **1 Claim**

1. In an indexable cutting insert having a shape of a platelike polygon, polygon, in which a plurality of cutting edges are, respectively, formed at sides of the polygon and a boss surface formed with a mounting hole for mounting the indexable cutting insert on an insert holder is provided on each of opposite faces of the indexable cutting insert such that a chip breaker

groove is formed between the boss surface and ridges of the cutting edges, the improvement comprising:

chip breaker groove having an inner wall extending from the cutting edge and an outer wall extending from the boss surface, a plurality of the projecting ridges rising integrally from the chip breaker groove and extending at each of the vertexes of the polygon, towards the ridges of the cutting edges from each of projecting portions of the boss surface;

said plurality of ridges include a first projecting ridge extending towards the nose portion and a pair of second




projecting ridges provided at opposed sides of and adjacent to the nose portion;

said projecting ridges being formed as to be disposed lower, in level, then the boss surface and the ridges of the cutting edges,

said first projecting ridge formed convexly angularly at the bottom of the chip breaker groove such that most of the outer side wall is exposed and said second projecting ridges form horizontally across the bottom of the chip breaker groove so as to bridge the inner and outer side walls such that a large area of the outer side wall is covered by the second projecting ridges.

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**4,941,781**

**MECHANICAL DRILLING AID**

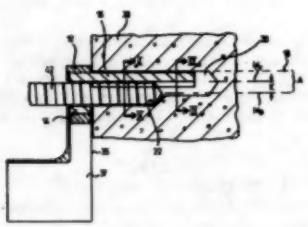
**Reinhard Becher, Engelbergstrasse 42, D-7000 Stuttgart 31, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 286,627, Dec. 19, 1988, Pat. No. 4,898,502. This application Dec. 8, 1989, Ser. No. 447,906**

**Claims priority, application Fed. Rep. of Germany, Sep. 29, 1988, 3833040**

**Int. Cl.[5] B23B *49/02***

**U.S. Cl. 408—72 B** **16 Claims**



1. Mechanical drilling aid for guiding a drilling tool when drilling a correct bore into an object, in particular into a wall, said correct bore to be drilled being disposed eccentrically to an existing faulty bore, wherein the cross-sections of said faulty bore and said correct bore to be drilled intersect each other or extend immediately adjacent to each other, comprising:

a guide element provided with an opening therein having a cylindrical wall serving for guiding said drilling tool, said cylindrical wall defining a circle at least as large as the circumferential circle of said drilling tool and having a longitudinal center axis coaxial with the axis of the drilling tool,

a rod-shaped part projecting from said guide element, said rod-shaped part being introducible into said faulty bore and abutting against an inner wall of said faulty bore, at least along an outer edge of said rod-shaped part,

a separate part corresponding in shape to the rod-shaped part, said separate part is intended to be inserted into said object, thereby filling a space between said correct bore and said faulty bore,

wherein the distance between said outer edge of said rod-shaped part and the longitudinal center axis of said cylindrical wall in said guide element is equal to the sum of the amount of eccentricity between said faulty and said correct bore, and the radius of said faulty bore, wherein said distance is measured across a center point of said cross-section of said faulty bore.

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**4,941,782**

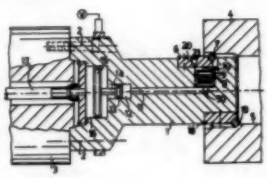
**ADJUSTABLE BORING BAR**

**Kenneth J. Cook, Troy, Mich., assignor to GTE Valenite Corporation, Troy, Mich.**

**Filed Dec. 30, 1988, Ser. No. 292,069**

**Int. Cl.[5] B23B *51/00***

**U.S. Cl. 408—147** **7 Claims**



1. A cutting tool of the type having an axis of rotation and a peripheral surface area spaced from the axis of rotation with at least one radially displaceable cutting bit mounted thereto comprising:

mean for biasing said cutting bit in a first radial direction with respect to said axis of rotation,

means for adjustably moving said cutting bit to a predetermined desired position, said adjustable moving means including a fluid pressure source for an incompressible electrorheological fluid, means communicating with said fluid pressure source and said cutting bit for the flow of electrorheological fluid and for adjustably moving said cutting bit in a direction opposing said first radial direction in proportion to pressure being generated by said fluid pressure source,

a valve means operably associated with said communicating means for effecting changes in the dynamic stiffness of said electrorheological fluid in response to an electric field,

electric field producing means for transmitting a sufficient electric field to said valve means to substantially block the flow of electrorheological fluid to said cutting bit from said fluid pressure source and maintain a predetermined radial position of said cutting tool.

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**4,941,783**

**DRILLING DEVICE**

**Elmar Maier, Feldkirch-Tisis, Austria, assignor to Hilti Aktiengesellschaft, Fürstentum, Liechtenstein**

**Filed Mar. 28, 1989, Ser. No. 329,435**

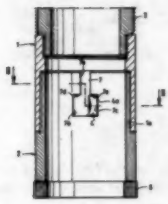
**Claims priority, application Fed. Rep. of Germany, Mar. 28, 1988, 3810540**

**Int. Cl.[5] B23B *51/04***

**U.S. Cl. 408—204** **3 Claims**

1. Drilling device having a drilling direction and comprising an axially extending hollow cylindrical retainer with a first end

and an opposite second end disposed transversely of the axial direction with the first end facing in the drilling direction, an axially extending annular drill bit detachably connected to said retainer, said drill bit having a first end and an opposite second end disposed transversely of the axial direction with the first end facing in the drilling direction, said retainer and said drill bit being in overlapping relation in the axial direction, one of said retainer and drill bit has at least one circumferentially and axially extending projection extending circumferentially therefrom and the other one of said retainer and drill bit has at least a recessed portion for receiving said projection, said recessed portion extending in the axial and circumferential directions and having a first axially extending section with a circumferential dimension at least equal to the circumferential dimension of said projection extending from one of the first end of said retainer or the second end of said drill bit, and a second axially extending section extending axially from and aligned with said first axially extending section and spaced from the one of the first end of said retainer or the second end of said drill bit, said first section having opposite axially extending first sides, said



second section having opposite axially extending second sides, said second sides spaced circumferentially from said first sides and said second section having circumferentially extending shoulders, each extending between one of said first and second sides transversely of the axial direction, and said second sides located circumferentially from each of said first sides for a dimension corresponding approximately to the circumferential dimension of said projection, said second end of said drill bit located between the first and second ends of said retainer and said first end of said drill bit spaced axially outwardly from the first end of said retainer, at least two said recesses are located in said drill bit and a corresponding number of said projections are located in said retainer, said projections are tangs formed and bent off from said retainer with said tangs projecting inwardly of said hollow retainer, and each said tang forming an axially extending edge spaced from a connection of said tang to said retainer with an entrainment shoulder thereon being arranged to bear against one of said second sides for effecting the transmission of rotational movement from said retainer to said drill bit.

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**4,941,784**

## DEVICE FOR STABILIZING OBJECTS WITHIN THE TRUNK OF A VEHICLE

**Daniel Flament, 54 Avenue de Verdun, Croissy sur Seine, France (78290)**

**PCT No. PCT/FR87/00250, § 371 Date Dec. 30, 1988, § 102(e) Date Dec. 30, 1988, PCT Pub. No. WO88/00144, PCT Pub. Date Jan. 14, 1988**

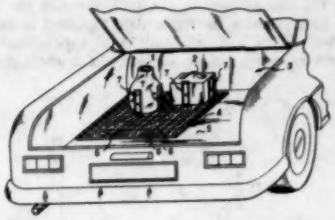
**PCT Filed Jun. 26, 1987, Ser. No. 302,232**

**Claims priority, application France, Jul. 9, 1986, 86 09967; Dec. 26, 1986, 86 18200**

**Int. Cl.[5] B61B *45/00***

**U.S. Cl. 410—121** **12 Claims**

1. Device for stabilizing objects within the trunk of a vehicle, in particular of an automobile, said device comprising a plate (4, 100) which is adapted to be placed on the floor of the trunk, said plate being provided with uniformly spaced holes (6, 101) and a series of members (7) which are adapted to be inserted vertically in the holes for stabilizing the objects, characterized in that said members are pegs (7) and that the plate is



provided with cavities (9, 10, 102) molded in this latter and shaped so as to receive unused pegs in a flat position.

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**4,941,785**

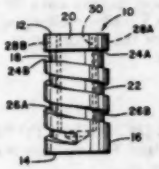
## POTTED INSERT FOR HONEYCOMB PANELS

**Donald W. Witten, P.O. Box 508, Collinsville, Okla. 74021**

**Filed Sep. 13, 1989, Ser. No. 406,563**

**Int. Cl.[5] F16B *39/02***

**U.S. Cl. 411—82** **3 Claims**




1. An insert for use in attachment of a threaded member, such as a bolt or the like, to a panel, such as a honeycomb panel, such as by use of epoxy adhesive, the insert comprising:

an unitary elongate member having a generally cylindrical external surface and an outer end and an inner end, and having on the external cylindrical surface at the outer end an integral annular collar portion and having a reduced external diameter circumferential recess contiguous to said collar portion, and having on the external cylindrical surface a spiraled recess communicating at one end with said circumferential recess and extending adjacent to but not to said inner end, the inner end having a diameter substantially equal to that of said member cylindrical surface, and having opposed notches in said annular collar portion communicating said outer end with said circumferential recess, and having an internal threaded recess therein coaxial with said member cylindrical external surface and extending from said outer end to adjacent said inner end.

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**4,941,786**

## EXCAVATOR

**Heinz Steinbock, Industriestrasse 30+32, 6718 Grunstadt, Fed. Rep. of Germany**

**Filed Feb. 27, 1989, Ser. No. 315,934**

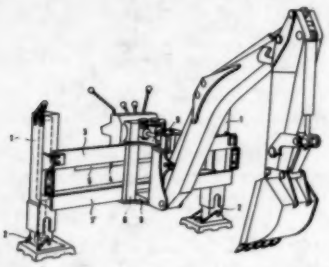
**Claims priority, application Fed. Rep. of Germany, Apr. 8, 1988, 8804637[U]**

**Int. Cl.[5] B66C *9/00***

**U.S. Cl. 414—695.7** **1 Claim**

1. An excavator including a frame for slidable attachment of an implement thereto, the frame comprising a pair of lateral limit vertical beams, upper and lower horizontal rails connected to the vertical beams, the rails being separated from one another and each rail defining top, bottom, front and rear

surface, the frame having but a single toothed rack with that rack attached to the bottom surface of the upper horizontal rail and disposed entirely behind the front surface of the upper rail, the rack running parallel to the rails between the vertical beams, a slide member having a plate mounted adjacent the front surfaces of the horizontal rails by an upper guide groove engageably enclosing the top surface of the upper rail and a



lower guide groove engageably enclosing the bottom surface of the lower rail such that the slide is mounted for horizontal sliding movement on the rails, the slide including means for mounting an implement thereto, and a drive motor attached to the slide and having a pinion meshing with the toothed rack such that actuation of the motor causes sliding movement of the slide on the rails.

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**4,941,787**

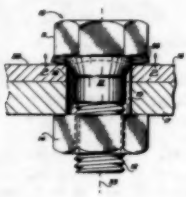
**LOCKING MECHANISM FOR FASTENER**

**James Shaffer, Maitland, Fla., assignor to Consolier Industries, Inc., Riviera Beach, Fla.**

**Filed Oct. 5, 1989, Ser. No. 417,640**

**Int. Cl.[5] F16B *39/24***

**U.S. Cl. 411—136** **3 Claims**



1. A locking mechanism comprising:

a fastener including a longitudinal shank having a lower threaded portion of circular cross-section with an outside diameter and an upper portion having an upwardly and outwardly tapered conical outer surface of elliptical cross-section having a major axis diameter and a minor axis diameter, a head joining a top end of said shank; and

a closed loop, annular ring washer having a circular inner edge of inside diameter greater than said outside diameter of said shank lower portion, and greater than said minor axis diameter of said shank upper portion, but less than said major axis diameter of said shank upper portion;

said inner edge of said washer and said cross-section of said upper portion being relatively configured, dimensioned and adapted so that when said bolt shank is inserted into an object with said inner edge of said washer surrounding said shank between said head and said object, and said head is drawn toward said object by means of said threaded portion to tighten said fastener, said washer is deformed axially longitudinally of said shank in circumferential sinusoidally periodic manner by reaction of said inner edge with said outer surface to impart a spring-like locking tension between said head and said object.

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**4,941,788**

**SCREW THREADED FASTENERS**

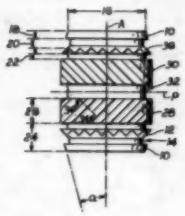
**Anthony M. Highfield, Ironbridge, England, assignor to P.S.M. International PLC, West Midlands, England**

**Filed May 30, 1989, Ser. No. 358,127**

**Claims priority, application United Kingdom, Aug. 3, 1988, 8818414**

**Int. Cl.[5] F16B *37/00***

**U.S. Cl. 411—178** **10 Claims**



1. A double ended fastener which is symmetrical about a mid-point on its longitudinal axis, comprising:

(a) a pilot portion at each end;

(b) an encircling groove next to each pilot portion;

(c) a minor toothed portion next to said groove;

(d) a second like groove next to said minor toothed portion; and

(e) a major toothed portion next to said second groove and extending towards said mid-point, the fastener having a female screw-threaded bore provided over the whole of its length.

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**4,941,789**

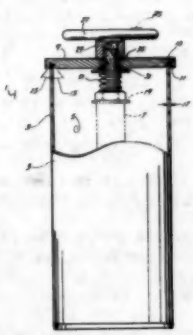
**APPARATUS FOR PREVENTING CROSS THREADING IN BLIND, HIGH PRECISION THREAD ENGAGEMENT**

**Charles Sims, P.O. Box 2787, Gulfport, Miss. 39505**

**Filed Feb. 3, 1988, Ser. No. 151,910**

**Int. Cl.[5] F16B *33/00*; F24H *1/00***

**U.S. Cl. 411—369** **2 Claims**



1. In a lid for blind fastening to a container, a self-aligning fastening means further comprising:

(a) a first threaded male cylindrical member within said

container, approximately coaxially aligned with an axis of said container;

(b) a second female fastening member with said lid adapted for rotation with respect to said lid;

(c) said second female fastening member being received within said lid in a high tolerance fit;

(d) said female member extending a distance interior to said lid against resistance of a spring means;

(e) said male member and said female member further comprising:

(1) said male member defining a thread pitch having a thread to thread linear pitch distance and a thread peak to thread peak diameter;

(2) said second female member having a mating famale thread having a thread pitch distance and an internal thread diameter mating to the thread on said male member;

(3) said famale thread defining a coaxial bore within said female member extending from an entry face of said famale member internally a distance into said female member;

(4) said coaxial bore defining an axis of said female member;

(5) a first cylindrical countersunk section within said bore, coaxial with said member axis, intermediate said entry face and said female thread;

(6) said countersunk section being of a diameter substantially equal to but not substantially greater than said thread peak diameter;

(7) said bore being of a length greater than four times said thread pitch distance.

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**4,941,790**

## CLAMP DEVICE FOR AXIALLY CLAMPING A TOOL, PARTICULARLY A DISC

**Manfred Kirn, Stuttgart, Fed. Rep. of Germany, assignor to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

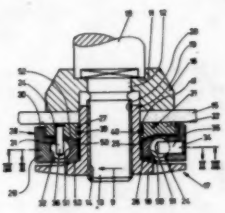
**PCT No. PCT/EP88/00015, § 371 Date Jul. 24, 1989, § 102(e) Date Jul. 24, 1989, PCT Pub. No. WO88/06075, PCT Pub. Date Aug. 25, 1988**

**PCT Filed Jan. 12, 1988, Ser. No. 391,535**

**Claims priority, application Fed. Rep. of Germany, Feb. 21, 1987, 3705638**

**Int. Cl.[5] F16B *37/08*; B24B *45/00*; B27B *5/32***

**U.S. Cl. 411—432** **20 Claims**



1. A clamp device for axially clamping a tool, in particular a disc, to a flange of a driven spindle, said clamp device comprising a clamp nut to be secured to the driven spindle; a clamp disc arranged between said clamp nut and the tool for pressing the tool to the flange; axial supporting means for securing said clamp disc to said clamp nut for joint axial movement thereof, said axial supporting means including a plurality of annular segments having an outer peripheral surface, a track on said outer peripheral surface, and a wedge-shaped cross-section, said clamp nut and said clamp disc having respective frustoconical supporting surfaces for engaging said annular segments; an operating member located between said clamp disc and clamp nut and comprising a ring rotatable relative thereto and having an inner track; a plurality of rolling members displaceable in said inner track of said ring and said outer tracks of said annular segments; a plurality of drivers associated with said rolling members, supported on said ring, and projecting into tracks of associated rolling members for enabling displacement of said rolling members in a release direction upon rotation of said ring in a predetermined direction to relieve said annular segments radially and said clamp disc axially, at least one of said clamp disc and clamp nut having a plurality of stops extending transversely into said tracks; and spring means for biasing said ring in a direction opposite to the predetermined direction of rotation thereof so that said drivers press associated rolling members against associated stops in a direction opposite to the release direction, said ring member having in a region of said inner track thereof a plurality of radial depressions into which said rolling members fall upon being displaced upon rotation of said ring in a predetermined direction.

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**4,941,791**

## HANDY BOOKBINDER

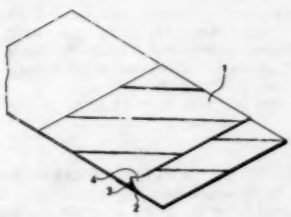
**Yasuhiko Iwamoto, 47-321, Chaya, Kyowa-cho, Ohbu-shi, Aichi-ken, Japan**

**Filed Apr. 11, 1988, Ser. No. 179,676**

**Claims priority, application Japan, Apr. 15, 1987, 62-057027; Apr. 21, 1987, 62-060540; Sep. 9, 1987, 62-225885**

**Int. Cl.[5] B42C *11/02*; B42D *3/00, 1/00*; A61F *13/02***

**U.S. Cl. 412—19** **7 Claims**



1. A document binding apparatus for holding together sheets of paper, including postal cards, calling cards, business cards, and photographs, comprising:

(a) first and second covers;

(b) a release agent applied to a portion of one surface of the first cover;

(c) a spine member of a predetermined width having an adhesive face on one surface thereof, wherein a portion of the adhesive surface is attached to one surface of the second cover and another portion of the adhesive surface is removably attached to the release agent of the first cover; and

(d) a removable sheet of release paper attached, the protection, to the portion of the adhesive surface of the spine member not attached to the first or second cover, said release paper being removable from the spine member to expose the adhesive surface for binding documents within the apparatus.

4,941,792

## HANDLING DEVICE FOR A DISTRIBUTION CHUTE OF A SHAFT FURNACE AND DRIVE MECHANISM SUITABLE FOR THIS DEVICE

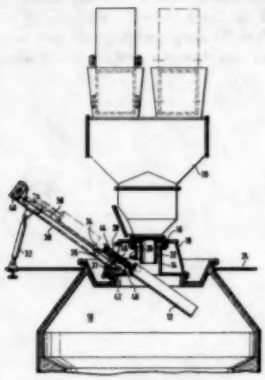
Giovanni Cimenti, Fentange; Emile Lonardi, Bascharage, and Pierre Mailliet, Howald, all of Luxembourg, assignors to Paul Wurth S.A., Luxembourg

Filed Jul. 19, 1989, Ser. No. 382,517

Claims priority, application Luxembourg, Jul. 25, 1988, 87291; Nov. 9, 1988, 87380

Int. Cl.[5] F23K 3/18

U.S. Cl. 414—208 7 Claims



1. An apparatus for charging a shaft furnace, comprising:
a platform adapted for mounting on the shaft furnace;
an outer housing rigidly attached to the platform;
an inner housing rotatably mounted within the outer housing, said inner housing having an axis of rotation;
a distribution chute pivotably suspended from the inner housing;
means for rotating the inner housing about the axis;
means for pivoting the chute relative to the axis; and
means for dismounting the chute, comprising:
an inclined ramp mounted on the platform;
a carriage slidably mounted on the ramp;
means for accessing the chute; and
means for fastening the carriage to the chute.

4,941,793

## SYSTEM FOR SENDING-OFF PRESS-FORMED PARTS

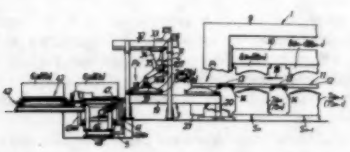
Motoatsu Shiraishi; Masaru Sasagawa; Ken Tazo; Masaaki Kubota, and Shinji Katayama, all of Sayama, Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha, Tokyo, Japan

Filed Dec. 20, 1988, Ser. No. 286,908

Claims priority, application Japan, Dec. 21, 1987, 62-323493; Jan. 13, 1988, 63-5456

Int. Cl.[5] B65H 31/00

U.S. Cl. 414—225 6 Claims



1. A system for removing press-formed parts formed in a pressing machine from said pressing machine, comprising loading transfer means disposed between an ejection position to which a plurality of press-formed parts are simultaneously ejected in parallel from said pressing machine and a pallet loading position established to simultaneously load said press-formed parts onto each pallet of a plurality of carrier pallets which are on standby in parallel to individually correspond to the plurality of press-formed parts to be removed, said loading transfer means comprising a plurality of transfer pallets connected to one another with variable spacing therebetween and reciprocally movable in parallel between the ejection position and the pallet loading position for simultaneously receiving a plurality of press-formed parts from said pressing machine and for simultaneously placing individual of said press formed parts on individual of said transfer pallets, and spacing-varying drive means for varying said spacing between said individual of said transfer pallets while the press-formed parts are transferred between said ejection position and said pallet loading position.

4,941,794

## AUTOMATED LOADING/UNLOADING EQUIPMENT

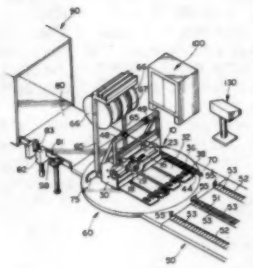
Yoshimasa Hara, Kawagoe; Seisaku Ohkura, Tsurugashima; Fumio Iijima, Sayama; Isamu Tamura, Tokikawa; Tetsuro Fukai, Sayama; Sumiho Tagiri, and Norimasa Takagi, both of Toda, all of Japan, assignors to Honda Giken Kogyo Kabushiki Kaisha and Nittsu Shoji Kabushiki Kaisha, both of Tokyo, Japan

Continuation-in-part of Ser. No. 166,557, Mar. 10, 1988, abandoned. This application Nov. 30, 1989, Ser. No. 442,454

Claims priority, application Japan, Mar. 11, 1987, 62-57698; Mar. 11, 1987, 62-57699

Int. Cl.[5] B65G 67/02

U.S. Cl. 414—341 3 Claims



1. An automated loading/unloading system having operable traveling lift trucks for loading and unloading cargos, comprising:
a motor for hydraulically steering a driving wheel in the lift truck;
a first mechanism for hydraulically moving multiple forks of the lift truck vertically;
distance sensor means installed at the tip of the forks and at a rear end of the lift truck for determining a cruisable safe distance at both its front and rear;
pressure sensor means installed in a hydraulic line interconnected to the motor for controlling movement of the lift truck.
limit sensor means installed in the lift truck for determining upper and lower limits between which the vertical movement of the forks is confined;
rotational direction sensor means installed in a turntable for determining the direction of rotation and the rotational angle of the turntable;
the rotatably disposed turntable provided to form part of a transport passage adapted for traveling of the lift truck, the turntable including a second mechanism for hydraulically turning and altering the orientation of the lift truck;
external drive means having a high-pressure low-delivery

pump which provides high-pressure, low-delivery fluid to the motor, the first mechanism and the second mechanism through a directional control valve means and a low-pressure high-delivery pump which provides low-pressure, high-delivery fluid to the motor through a directional control valve means; and

an external control system which, in accordance with a loading/unloading program, controls the external drive means to actuate the driving wheel, the forks of the lift truck and the turntable in timed relation in response to signals from the distance sensor means, the pressure sensor means, the limit sensor means and the rotational direction sensor means.

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**4,941,795**

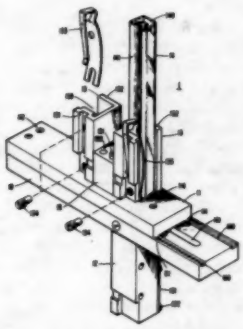
**COMPONENT INSERTION MACHINE APPARATUS**

**William A. Elliott, Reynoldsburg; Richard A. Greene, Pickerington; Robert P. Kennedy, Westerville; Robert P. Poe, Jr., and William H. Steece, both of Columbus, all of Ohio, assignors to AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Nov. 21, 1988, Ser. No. 274,098**

**Int. Cl.[5] H05K *3/30***

**U.S. Cl. 414—403** **1 Claim**



1. Shuttle apparatus for loading components stored in component magazines into a component insertion machine having a mounting post formed with a first cavity therein for receiving ones of the components wherein said shuttle apparatus comprises

a generally rectangularly configured shuttle member having a pair of parallel ribs each formed on a bottom surface of said shuttle member and having a plurality of aligned second cavities formed therein and mounting component magazine receptacles on a top surface for receiving ones of the component magazines and aligning each received component magazine with a corresponding one of said second cavities, and

a generally rectangularly configured base member having an aperture formed therein for receiving the mounting post and having a pair of slots formed along a lateral axis to receive restraining devices free to move within said slots with said slots in combination with a pair of parallel channels each formed along an upper surface thereof to correspond with and receive one of said shuttle member ribs for securing and slidably supporting said shuttle member and enabling the operation thereof for laterally displacing one of said received component magazines with others of received component magazines by aligning ones of said shuttle member second cavities with said first cavity to maintain a continuous supply of components to the component insertion machine.

**4,941,796**

**FRONT LOADING REFUSE VEHICLE**

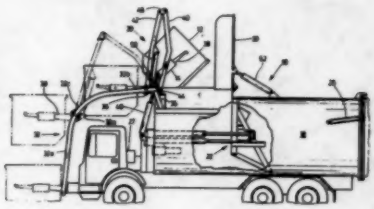
**Quinto De Filippi, 29 Edenvalley Drive, Islington, Ontario, Canada (M9A 4Z5)**

**Filed Jan. 23, 1989, Ser. No. 299,469**

**Claims priority, application Canada, Apr. 29, 1988, 565609**

**Int. Cl.[5] B65F *3/02, 3/04, 3/14***

**U.S. Cl. 414—409** **4 Claims**



1. A front loading refuse vehicle of the type used in connection with a refuse receptacle at a refuse collection site, said vehicle comprising:

a front portion including a cab;

a rear portion adapted to carry refuse;

a pair of rails located on respective sides of said front portion, and defining forward rail portions extending upwardly in front of said cab and rearward portions extending rearwardly of said cab, and curved intermediate portions extending between said forward and rearward portions;

carriage means adapted to run on said rails between forward positions at the lower ends of sid forward rail portions, forward of said cab, and rearward positions at rear ends of said rearward rail poritons, rearwardly of said cab;

lifting arms moveably mounted on said carriage means and being adapted to engage said receptacle and lift the same:

hoist arms of a predetermined length pivotally mounted to the rearward ends of said rails for swinging between forward positions adjacent said rearward and intermediate rail portions, and upward positions extending at least perpendicularly upwardly;

hoist arm power means mounted on said vehicle and connected to said hoist arms for operating said hoist arms;

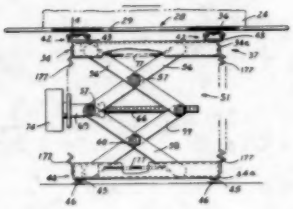
hoist linkage means of a predetermined length substantially equal to said length of said hoist arms, and extending therefrom in a forward position downwardly adjacent said forward rail portions, connecting between said hoist arms and said carriage means, and being moveable from said forward position to a reaerward positon substantially perpendicular alongside said hoist arms in their uprigth postions, whereby operation of said hoist arms and linkages will cause said carriage means to move along said rails from said forward position to said rearward position rearward of said cab, and,

lifting arm power means mounted on said hoist arm linkage means and operable to swing said lifting arms away from and towards said rials, whereby said lifting arms are adapted to engage a refuse receptacle in front of said cab, and raise the same upwardly and transport same rearwardly along said rails to a point rearward of said cab.

## 4,941,797
## POWER-OPERATED LIFT AND PRESENTING MECHANISM

Charles M. Smillie, III, West Bloomfield, Mich., assignor to C.M. Smillie & Company, Ferndale, Mich.

Continuation-in-part of Ser. No. 17,922, Feb. 24, 1987, Pat. No. 4,725,183. This application Dec. 28, 1987, Ser. No. 138,916
The portion of the term of this patent subsequent to Feb. 16, 2005, has been disclaimed.
Int. Cl.[5] B65G 67/00
U.S. Cl. 414—462 13 Claims



1. A power operated lift and presenting mechanism for conveniently loading and unloading articles to and from the trunk of an automobile in which the trunk has a floor, the power operated lift and presenting mechanism comprising:

a base structure adapted to be seated on said floor of the trunk;

a carriage movable from a transport position to an elevated position and from the elevated position to the transport position, said carriage having track means disposed generally in a plane parallel to said floor of the trunk, when said base structure is seated on said floor of the trunk, and track following means engaged by said track means so as to be movable to and fro, along said track means, between a retracted position and a presenting position;

a platform connected to said track follower means so as to be movable with said track follower means between the retracted position, in which said platform is disposed generally over said base structure when said base structure is seated on the floor of the trunk, and the presenting position, in which said platform is disposed generally out from over said base structure when said base structure is seated on the floor of the trunk;

power operated lifting means for actuating said carriage upwardly from the transport position to the elevated position and downwardly from the elevated position to the transport position, said platform being in a retracted position when said carriage is so moved;

whereby, when said base structure is seated on said floor of the trunk and said carriage is in the elevated position, said platform may be moved to a presenting position in which said platform projects out from the trunk so that articles may be loaded and unloaded at elevation and disposition that is convenient for loading and unloading the articles;

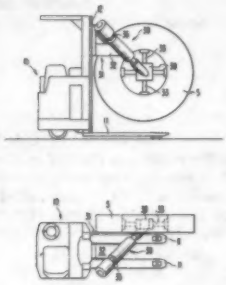
said lifting means includes a lift assembly disposed between said carriage and said base structure; and

means enclosing said lift assembly, said enclosing means includes bellows respectively connected to said carriage and said base structures and spanning therebetween.

## 4,941,798
## MEANS FOR MANIPULATING AND TRANSPORTING LOADS

Jacques Meier, Büretswil, Switzerland, assignor to SFT AG Spontanfördertechnik, Weinfelden, Switzerland

Filed Sep. 27, 1988, Ser. No. 250,250
Claims priority, application Switzerland, Oct. 13, 1987, 03998/87
Int. Cl.[5] B66F 9/18; B65H 29/00; B66C 1/24
U.S. Cl. 414—619 9 Claims



1. A manipulator for handling a heavy load, the load being of a type having a surface defining an opening into and from which a manipulator member can be inserted and removed and wherein the center of gravity of the load is located in the opening, the manipulator comprising the combination of

a pivot pin having a central axis;

holding means insertable into the opening in said heavy load for engaging said surface defining the opening in said load;

means for attaching said holding means to one end of said pivot pin with said holding means at the center of gravity of said load when said holding means engages said surface such that said holding means is rotatable about said central axis of said pivot pin and so that rotation of said holding means about said central axis causes rotation of said load about its center of gravity; and

mounted means including a vehicle having a longitudinal axis for rotatably holding said pivot pin with said central axis of said pivot pin at a first predetermined angle between zero and ninety degrees with respect to a horizontal plane and a second predetermined angle between zero and ninety degrees with respect to a vertical plane containing said longitudinal axis of said vehicle whereby rotation of said pivot pin moves said holding means and said load through three orthogonal positions.

## 4,941,799
## DISPLACEABLE SUPPORT FOR WHEELCHAIR

George W. Gordon, Allentown, and Theodore F. Economy, Orefield, both of Pa., assignors to Gordecon, Inc., Catasauqua, Pa.

Filed Sep. 20, 1988, Ser. No. 246,972
Int. Cl.[5] A61G 7/00
U.S. Cl. 414—678 14 Claims

1. An apparatus for controllably positioning a wheelchair, comprising:

a base;

a vertical extension mechanism connected by one end to said base, and means for operating the vertical extension mechanism to extend and to retract;

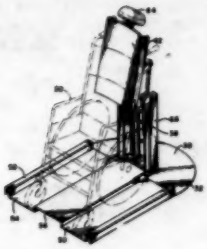
a chassis connected to a second end of said vertical extension mechanism;

support means for engaging and supporting a wheelchair, the support means being carried at least partly on the

chassis, the support means receiving and supporting the wheelchair during extension and retraction;

an angular extension mechanism disposed on the chassis, the angular extension mechanism being operable to rotate the support means around an axis adjacent the chassis; and,

linear vertical guide means on the base for guiding vertical displacement of the chassis on the base, the vertical guide



means including a guide shaft and a bushing, one of the guide shaft and the bushing being mounted on a main support leg on the base and the other of the guide shaft and the bushing being mounted on the chassis, the vertical guide means also including at least one roller mounted on the chassis, the roller movably bearing on the main support leg.

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**4,941,800**

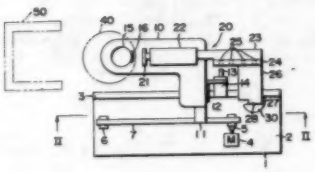
**TRANSFER APPARATUS FOR PLATE-LIKE MEMBER**

**Hisashi Koike; Itaru Takao; Masaki Narushima, and Kiyoshi Takekoshi, all of Yamanashi, Japan, assignors to Tokyo Electron Limited, Tokyo, Japan**

**Filed Oct. 21, 1988, Ser. No. 260,608**

**Int. Cl.[5] B65G *1/00***

**U.S. Cl. 414—752** **17 Claims**



1. A plate-like member transfer apparatus for transferring a plate-like member into a storage/guide unit having an entrance for the plate-like member, the entrance being defined by two side walls of the storage/guide unit, said apparatus comprising:

supporting means for supporting the plate-like member thereon such that the plate-like member is movable in response to a force applied thereto;

moving means for moving said supporting means to said storage/guide unit to thereby transfer said plate-like member into said storage/guide unit; and

adjusting means, which is moved to said storage/guide unit together with said supporting means by said moving means, for pressing against the plate-like member when the plate-like member contacts at least one of the side walls of the storage/guide unit, wherein the combination of said adjusting means, said moving means, said supporting means, and said at least one of the side walls rotates said plate-like member to a position in which said plate-like member is aligned with the entrance of said storage/guide unit, thereby fitting the plate-like member into the entrance of the storage/guide unit.

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**4,941,801**

**DOUBLE WATER PUMP DEVICE**

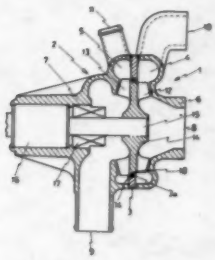
**Yoshinari Takakura, Anjo, Japan, assignor to Aisin Seiki Kabushiki Kaisha, Kariya, Japan**

**Filed Mar. 23, 1989, Ser. No. 327,697**

**Claims priority, application Japan, Mar. 23, 1988, 63-037825[U]**

**Int. Cl.[5] F01D *15/00***

**U.S. Cl. 415—170.1** **5 Claims**



1. A water pump device comprising:

a pump housing;

a pump shaft rotatably mounted in said housing;

a rotor mounted on said pump shaft;

an annular partition wall mounted on said housing and extending into said housing so as to form a planar extension of said rotor;

means for forming a seal between said partitions wall and said rotor;

wherein said rotor and partition wall define first and second substantially independent pump chambers in said housing, an inner diameter of said partition wall being greater than an outer diameter of said rotor at any axial plane including said partition wall and said rotor, whereby said partition wall may be fitted on the rotor in the axial direction.

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**4,941,802**

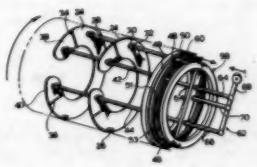
**MULTI-BLADED PROPULSION APPARATUS**

**John C. Ross, 14 Dustan Crescent, Toronto, Ontario, Canada (M4J 4G5)**

**Filed Jun. 2, 1989, Ser. No. 360,591**

**Int. Cl.[5] B63H *3/02***

**U.S. Cl. 416—164** **7 Claims**



1. A propulsion apparatus for fluid medium comprising:

an open-ended sleeve having an inlet and outlet for flow through of fluid, said sleeve being rotatably attached to a drive means;

a series of blades positioned within and along said sleeve, each of said blades having a leading and trailing edge and

each of said blades being attached to said sleeve for rotation therewith;

said blades cooperating to define a fluid path to accelerate a fluid from said inlet to said outlet to thereby provide thrust for propulsion as said sleeve is rotated;

adjusting means interconnecting said blades for pitch adjustment of said leading and trailing edges of said blades.

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**4,941,803**

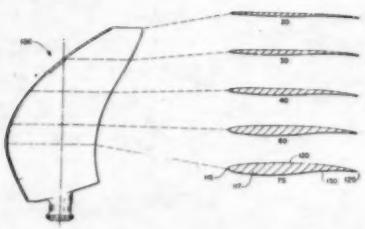
**AIRFOILED BLADE**

**Harry S. Wainauski, Simsbury, Conn., and Carol M. Vaczy, Swampscott, Mass., assignors to United Technologies Corporation, Hartford, Conn.**

**Filed Feb. 1, 1989, Ser. No. 304,676**

**Int. Cl.[5] B64C *11/18***

**U.S. Cl. 416—242** **7 Claims**



1. An aircraft propeller blade having a root portion, and a tip portion, said blade comprising:

a plurality of airfoil sections having a thickness ratio of between 7.5% and 2%;

each section having along substantially the entire length thereof, a cross sectional shape characterized by;

a parabolic leading edge,

a camber having a minimal slope extending from the leading edge to about a 40% chord and having an apogee at a 74% chord,

a gradual pressure recovery upper surface from about the 40% chord to a trailing edge,

a concave lower surface from about the 40% chord to the trailing edge to generate life, said upper and lower surfaces merging into a relatively blunt trailing edge, and

a maximum thickness positioned along the length of each airfoil section from said tip portion to said root portion, said maximum thickness of each airfoil section located from a 37.5% chord for an airfoil at said tip portion to a 35.0% chord at said root portion for an airfoil whereby said propeller blade forms one of an airfoil family.

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**4,941,804**

**PLASTIC MULTI-RING PAPER BINDING SYSTEM USING ONE PIECE COVER**

**John B. Sarpy, Jr., 2717 Ridgelake Dr., Metairie, La. 70002**

**Filed Apr. 27, 1989, Ser. No. 344,219**

**Int. Cl.[5] B42B *5/10***

**U.S. Cl. 412—7** **7 Claims**

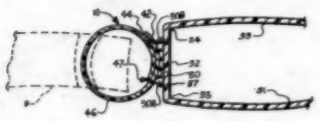
1. A binding apparatus for binding together sheets of perforated paper, each with correspondingly placed multiple openings along a margin thereof, comprising:

(a) a three panel one piece cover set including front and rear covers connected by a smaller cover spine portion with inner and outer surfaces and a longitudinal center line axis;

(b) a pair of parallel hinges defining respectively pivotal connections between each cover and the spine portion and generally parallel to the spine centerline;

(c) a plastic ring-type binder having a generally circular cross section, and including a curved back portion with a curvature greater than the curvature of the spine portion, and including an inner concave surface and an outer convex surface and parallel side portions, one side portion having a row of multiple, closely spaced flexible rings extending therefrom, each with a free end portion, the rings having a memory which returns them to assume a generally circular configuration after the rings are opened, such as during the addition of perforated paper thereto;

(d) an elongated adhesive bead member extending along the plastic back convex surface and positioned along the spine centerline, generally between the spine end portions and spaced away from the fingers so that the fingers can be



opened for adding paper thereto, bonding the plastic ring-type binder to the cover adjacent the cover spine portion thereof, and without substantial migration of the bead to the cover set outer surface so that printed matter can be added to the cover spine portion outer surface without interference by the bead; and

(e) the bead extending laterally toward the scores and providing spaced thicker portions away from the longitudinal centerline axis of the spine for bonding the plastic ring type binder to the spine as the different curvature of the ring-type binder and spine diverge away from the centerline.

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**4,941,805**

**DEVICE FOR CENTERING A DRIVE SHART ON A HUB**

**David Matthews, 1510 Greenbrier, Green Oaks, Ill. 60048**

**Continuation of Ser. No. 150,019, Jan. 29, 1989, abandoned. This application Jul. 24, 1989, Ser. No. 384,880**

**Int. Cl.[5] F01D *5/32***

**U.S. Cl. 416—204 R** **11 Claims**

1. A method of centering and drivingly connecting the hub of a driven member with a drive shaft having an end face with a centrally projecting externally threaded stud which comprises:

forming an apertured radial wall on the hub for receiving the stud therethrough and for bottoming on the end face of the shaft,

forming shaft embracing portions on the face of the hub to be bottomed on the end face of the shaft to center the true axis of the hub on the shaft, said shaft embracing portions

being formed after the driven member is formed and assembled, and

threading a nut on the stud to clamp the wall between the end face of the shaft and the nut.

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**4,941,806**

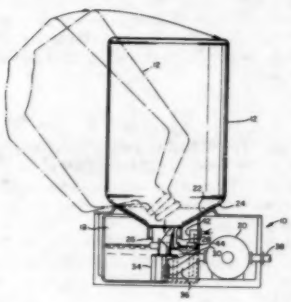
## BOTTLED WATER PUMPING APPARATUS

**Toran S. Brown, Los Angeles, and William T. McGregor, Malibu, both of Calif., assignors to The McGregor Company, Santa Monica, Calif.**

**Filed Dec. 12, 1988, Ser. No. 283,502**

**Int. Cl.[5] F04B *49/00***

**U.S. Cl. 417—38** **19 Claims**



1. An apparatus for supplying bottled water from a bottle to an appliance comprising:

a unitary assembly for location at an elevation below the elevation at which bottled water is to be supplied to the appliance;

a reservoir for holding water, said reservoir being located adjacent the bottom of said assembly;

a motor driven pump that has an inlet communicating with the water in said reservoir, said pump having an outlet communicating with said appliance;

a water pressure sensitive switch in communication with said pump outlet, said switch being set to connect said motor to a source of electricity for starting the motor and pump automatically when the water pressure in said pump outlet falls below a predetermined value; and

a bottle support disposed above said reservoir for receiving said bottle and supporting said bottle in an inverted position such that said reservoir is partially filled with water from said bottle.

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**4,941,807**

## HYDRAULIC POWER GENERATING PACK

**Malcolm C. Foster, Sandal, England, assignor to Gullick Dobson Limited, Horbury, England**

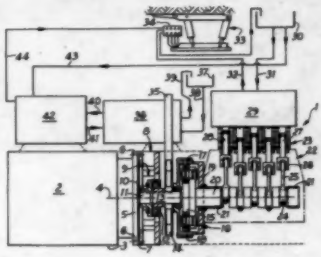
**Filed Feb. 7, 1989, Ser. No. 307,787**

**Claims priority, application United Kingdom, Feb. 20, 1988, 8803974**

**Int. Cl.[5] F04B *23/08***

**U.S. Cl. 417—199.1** **8 Claims**

1. An hydraulic power generating pack comprising a primary pump of the multi-cylinder, reciprocating ram type, a reciprocable piston located in each of said cylinders and a crank shaft rotatable by a prime mover and serving to displace each said piston to provide a primary hydraulic fluid output at a predetermined constant pressure and constant volume, a power take-off, a secondary pump of the pressure compensated variable delivery type, driven by said power take-off, a pressure intensifier output from said secondary pump driving an intensifier which intensifies to a required secondary pressure



and volume, hydraulic fluid supplied to said intensifier at a first pressure and volume.

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**4,941,808**

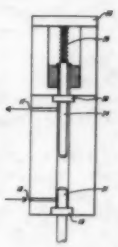
## MULTI-MODE DIFFERENTIAL FLUID DISPLACEMENT PUMP

**Humayun Qureshi, 77 E. Plain St., Wayland, Mass. 01778; Stanley M. Liffmann, 4 Fiske Rd., Andover, Mass. 01810, and John D. Czaban, 4 Duck Pond Rd., Unit 202, Beverly, Mass. 01915**

**Filed Jun. 29, 1988, Ser. No. 213,169**

**Int. Cl.[5] F04B *13/00***

**U.S. Cl. 417—415** **9 Claims**



1. A multi-mode, differential displacement pump for obtaining two different measured doses with high resolution in a single stroke,

said pump comprising an elongated chamber carrying first and second pistons therein,

said first piston defining a first volume being reciprocally mounted in said chamber,

said second piston defining a second volume being reciprocally mounted in said chamber,

said chamber having a first and a second portion,

means for moving in a single stroke, only one of said pistons in said first portion of said chamber to define a first measured dose and said one piston along with the other of said pistons in said second portion of said chamber to define a second measured dose different from said first measured dose, and

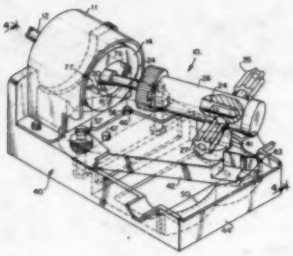
means for positioning said other piston at a predetermined position in said chamber.

**4,941,809**

## VALVELESS POSITIVE DISPLACEMENT METERING PUMP

**Harry E. Pinkerton, 1 Bridle Path La., Mill Neck, N.Y. 11765**

**Filed Feb. 13, 1986, Ser. No. 829,398**
**Int. Cl.[5] F04B 7/06**
**U.S. Cl. 417—500** **9 Claims**



1. A valveless, variable displacement, fixed head volume, piston metering pump comprising:

a cylinder having port means to direct fluid and a head chamber to contain fluid;

a rotatable piston in said cylinder, said piston having an axis;

duct means on said piston communicable with said port means for transfer of said fluid to and from the cylinder head chamber;

drive means for said piston, said drive means having an axis, and means for causing said piston to reciprocate in said cylinder to and from a fixed dead volume point while rotating in a timed relation with respect to said port means; and

means for reversing said timed relationship through reversal of relative angularity between said axes to obtain fluid flow reversal at flow rates determined by the degree of relative angularity of the two axes.

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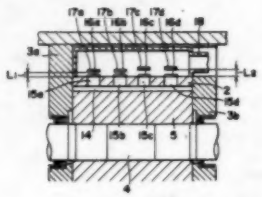
**4,941,810**

## SLIDING-VANE ROTARY COMPRESSOR

**Masahiro Iio; Yoshio Suzuki; Hidehiko Takayama, and Katsumi Sakamoto, all of Konan, Japan, assignors to Diesel Kiki Co., Ltd., Tokyo, Japan**

**Filed Jun. 14, 1989, Ser. No. 366,136**
**Claims priority, application Japan, Jul. 15, 1988, 63-93590[U]**
**Int. Cl.[5] F04C 18/344, 29/08**
**U.S. Cl. 418—15** **2 Claims**



1. A sliding-vane rotary compressor comprising:

(a) a compressor body composed of a cylinder and a pair of side blocks attached to opposite ends of said cylinder, said compressor body having an inlet disposed at one of a front side and a rear side of said cylinder;

(b) a rotor rotatably disposed in said compressor body and carrying thereon a plurality of radially movable sliding vanes, there being defined between said cylinder, rotor and vanes a plurality of compression chambers which vary in volume with each revolution of said rotor;

(c) a plurality of aligned discharge holes disposed in a direction parallel to a longitudinal axis of said cylinder;

(d) a plurality of discharge valves disposed on said cylinder and normally closing said discharge openings, respectively, said discharge valves being displacable to open the corresponding discharge openings when they are forced to open by a compressed fluid, thereby allowing a compressed fluid to flow out from said compression chambers; and

(e) means for limiting the displacement of said discharge valves such that openings of the respective discharge valves progressively increase in a direction from the front side to the rear side of said cylinder when said inlet is disposed at said front side of said cylinder, and said openings of the respective discharge valves progressively increase in a direction from the rear side to the front side of said cylinder when said inlet is disposed at said rear side of said cylinder.

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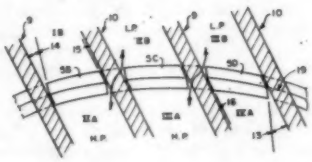
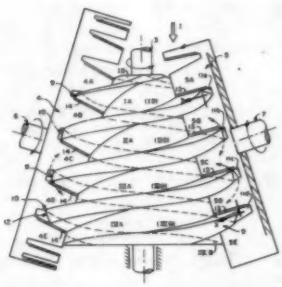
**4,941,811**

## LEAKAGE PATH INTERCONNECTION FOR SINGLE SCREW MECHANISMS

**David C. Winyard, Annapolis, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Continuation-in-part of Ser. No. 908,859, Aug. 25, 1986, Pat. No. 4,824,348. This application Dec. 21, 1988, Ser. No. 287,362**
**Int. Cl.[5] F01C 1/20, 3/08**
**U.S. Cl. 418—195** **5 Claims**





1. A single screw mechanism having an inlet and an outlet, comprising:

a compound mainrotor formed with a plurality of threads, each said thread having a thread winding around said mainrotor of at least one full turn, said mainrotor having a varying radius along the length of said mainrotor;

a housing, cooperating with said mainrotor threads, forming at least one chamber, each said chamber in fluid communication at a first end with said inlet of said single screw mechanism and in fliud comunication at a second end with said outlet of said single screw mechanism;

a plurality of cylindrical gaterotor having teeth which are in meshing relation with said mainrotor threads, said gaterotor teeth sealedly cooperating with each said chamber such that said first end of each said chamber is sealed from said second end of each said chamber by a plurality of teeth of one gaterotor and at least one tooth of another gaterotor for at least a portion of each cycle, forming pockets, each said pocket bounded by a leading tooth of one gaterotor and a trailing tooth of another gaterotor;

characterized in that the instantaneous rate of volume swept by each said tooth per unit of mainrotor rotation and the volume of each said pocket are controlled by varying the engaged area of each said gaterotor tooth commensurate with said varying radius of said mainrotor as each said tooth progresses along the length of said mainrotor.

2. A single screw mechanism having an inlet and an outlet, comprising:

a mainrotor formed with a plurality of threads, each said thread having a thread winding around said mainrotor of at least one full turn;

a housing, cooperating with said mainrotor threads, forming at least one chamber, each said chamber in fluid communication at a first end43 5ith said inlet of said single screw mechanism and in fluid communication at a second end with said outlet of said single screw mechanism;

a plurality of cylindrical gaterotors corresponding to the number of mainrotor threads each rotating around axes skew to each other and symmetrically skew to the mainrotor axis and each having teeth which are in meshing relation with said mainrotor threads, said gaterotor teeth sealedly cooperating with each said chamber along a gaterotor sealing plane such that said first end of said chamber is sealed from each said second end of said chamber by a plurality of teeth of one gaterotor and at least one tooth of another gaterotor for at least a portion of each cycle;

characterized in that as the gaterotor teeth flanks enter the mainrotor they emcounter the minimum relative angle of motion between the teeth and said mainrotor and as the teeth flanks leave the mainrotor they encounter the maximum relative angle of motion between the teeth and said mainrotor.

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## 4,941,812

## SPINNERET FOR PRODUCTION OF A HOLLOW FILAMENT WITHIN A HOLLOW FILAMENT COMPOSITE FIBER HAVING SPACING MEANS

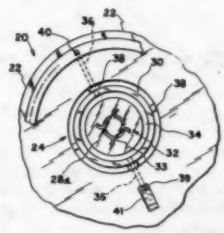
Harry V. Samelson, Chadds Ford, Pa., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 10, 1988, Ser. No. 193,710

The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.

Int. Cl.[5] B28B *21/52*; B29C *47/04, 47/20*

U.S. Cl. 425—131.5 4 Claims




3. A spinneret for the production from first and second non-adhering molten polymers of a hollow filament containing within itself a co-spun filament comprising: a plate having upper and lower surfaces connected by a capillary, said capillary comprising an inner segmented passage through which said first molten polymer passes and an outer annular passage concentric with the inner segmented passage through which said second molten polymer passes; said inner segmented passage having a center point each segment of said inner segmented passage comprises a first portion in the form of an arc curved about the center point of the inner segmented passage, a second portion extending in a straight length from said first portion and connected to a third portion, said third portion being in the form of a reverse curve with respect to said first portion.

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## 4,941,813

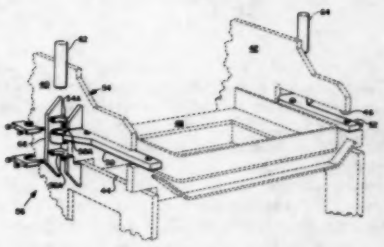
## MOLD GUIDANCE SYSTEM FOR BLOCK MAKING MACHINERY

Lloyd T. Grubb, Jr., Rte. 7, Box 250, Apex, N.C. 27502, and Joseph T. Kennamer, 1606 Dunblane Crt., Cary, N.C. 27511

Filed Dec. 13, 1988, Ser. No. 283,832

Int. Cl.[5] B28B *3/02*

U.S. Cl. 425—195 10 Claims



1. In combination with a concrete block making machine having a frame defining a horizontally extending elongate opening in each of two opposing sides thereof, each of said openings having an open end and a closed end, an open bottom mold to receive material therein for molding blocks and defining two inside corners adjacent said closed ends of said openings and two outside corners adjacent said open ends of said openings, said mold being supported on each opposing sides thereof within said respective openings and being mounted for vibratory movement relative to said frame, a head member movable into said mold for compacting block molding material placed therein, a pallet support adapted to lift and hold a pallet against the bottom of said mold when a block is being molded and to then drop to allow for ejection of the completed molded block from the mold, the improvement which comprises:

a mold guidance system comprising:

a mold support arm secured to and extending laterally outwardly from each of said opposing sides of said mold substantially adjacent the two inside corners thereof, and each arm defining an aperture in an outer end thereof;

a pair of first clamp elements each secured to a respective side of said frame above said opening defined therein and adjacent to said closed end of said opening in substantial vertical alignment with a respective mold arm aperture;

a pair of second clamp elements each secured to a respective side of said frame below said opening defined therein and adjacent to said open end of said opening in substantial vertical alignment with a respective mold arm aperture; and

a pair of elongate pins each being slidably positioned within a respective one of the mold arm apertures and fixedly engaged by a respective one of said pair of first clamp elements and a respective one of said pair of second clamp elements;

whereby said mold may move vertically on said elongate

pins during vibration thereof during the concrete block making process but is prevented from moving laterally.

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**4,941,814**

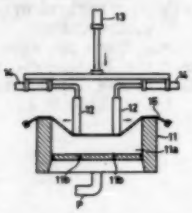
## VACUUM FORMING APPARATUS

**Kazui Araki, Ora; Yoshio Kobayashi, Ota; Seiji Matsumoto, Ota, and Hisao Fukushima, Ota, all of Japan, assignors to Shigeru Kogyo Kabushiki Kaisha, Japan**

**Division of Ser. No. 72,701, Jul. 13, 1987, Pat. No. 4,847,034. This application Feb. 21, 1989, Ser. No. 313,085**

**Int. Cl.[5] B29C *51/10***

**U.S. Cl. 425—388** **9 Claims**



1. A vacuum forming apparatus comprising: a female mold having formed therein a recess, said recess being defined by a wall surface having a bottom face and a side wall face section intersected at an angle with said bottom face;

plug means arranged in facing relation to an opening of said recess, said plug means having a face which is substantially parallel to said side wall face section of said recess:

first moving means for moving at least one of said female mold and said plug means in a first direction in which said plug means and said bottom face of said recess relatively move toward each other while the parallel relation being maintained between said face of said plug and said side wall face section of said recess, to cause said plug means to urge a sheet material toward the bottom face of said recess while stretching the sheet material;

second moving means for moving said plug means in a second direction substantially perpendicular to said first direction, in which said plug means moves toward said side wall face section of said recess while the parallel relation being maintained between said face of said plug and said side wall face section, to cause said plug means to urge the sheet material against said side wall face section; and

means for evacuating a substantially closed space defined by said recess and the sheet material, to being the sheet material into intimate contact with said wall surface of said recess.

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**4,941,815**

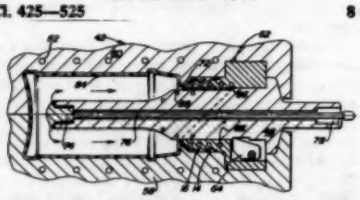
## INJECTION-BLOW MOLDING APPARATUS

**Randall K. Julian, Evansville, Ind., assignor to Sunbeam Plastics Corporation, Evansville, Ind.**

**Filed Jan. 19, 1989, Ser. No. 299,969**

**Int. Cl.[5] B29C *49/06***

**U.S. Cl. 425—525** **8 Claims**



1. Apparatus in combination with an injection-blow molding machine for forming a container having a neck with closure attachment means and a radially

an injection mold having a neck forming portion for forming a parison with a container neck; offset structure, said machine including:

a blow mold;

a core rod; and

positioning means for sequentially locating said core rod in an operative position relative to said injection mold to mold a parison and in an operative position relative to said blow mold for forming said container;

said apparatus comprising:

at least one circumferentially continuous neck forming sleeve concentrially spaced around said core rod said sleeve having means for forming said container neck with said closure attachment means and said radially offset structure when said core rod is in said operative position relative to said neck forming portion of said injection mold; and

securing means for maintaining said core rod and neck forming sleeve in fixed axial relationship relative to each other during formation of said parison with said container neck in said injection mold and during location of said neck forming sleeve, said core rod and parison in an operational position relative to said blow mold, said securing means being operable to allow movement of said core rod and neck forming sleeve axially relative to each other for removal of said container from said machine.

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**4,941,816**

## ROTARY TYPE INJECTION BLOW MOLDING MACHINE

**Katashi Aoki, deceased, late of Sakaimachi, and by Satoru Kimura, heir, 3-5-6, Saido, Urawa-shi, Saitama-ken, both of Japan**

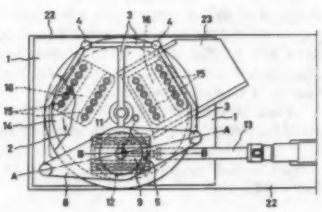
**PCT No. PCT/JP88/00387, § 371 Date Dec. 19, 1988, § 102(e) Date Dec. 19, 1988, PCT Pub. No. WO88/08366, PCT Pub. Date Nov. 3, 1988**

**PCT Filed Apr. 20, 1988, Ser. No. 315,790**

**Claims priority, application Japan, Apr. 20, 1987, 62-96686**

**Int. Cl.[5] B29C *49/06, 49/36***

**U.S. Cl. 425—533** **3 Claims**



1. In a rotary type blow molding machine in which a transfer plate provided at the underside with lip molds at three locations is intermittently rotatably provided above a machine bed to form a working space between said transfer plate and the machine bed, the three locations on the machine bed being used as three working stages, the three working stages being an injection molding stage, an orientation blow molding stage and a removing stage, said injection molding stage having a vertical type clamping device with tie bars and an injection mold disposed thereon, said orientation blow molding stage having a blow mold and devices required for the orientation blow molding and said removing stage having a release device for releasing molded articles, and an injection device is disposed lengthwise of the machine bed with respect to said injection mold, wherein the improvement comprising said injection molding stage is set sideward on the machine bed, said orientation blow molding stage is positioned inwardly of the machine bed, the

clamping device in said injection molding stage is obliquely positioned lengthwise of the machine bed and stands upright, said injection mold is provided parallel to the side edge of the machine bed and in the central portion of said clamping device, and said injection device is arranged on a center line of the injection mold obliquely crossed with respect to an axis of said tie bars in the clamping center of the clamping device.

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**4,941,817**

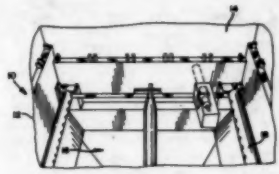
**IGNITOR HOUSING FOR BARBECUE GRILL**

**Erich J. Schlosser, Barrington, Ill., assignor to Weber-Stephen Products Co., Palatine, Ill.**

**Filed Aug. 11, 1989, Ser. No. 392,838**

**Int. Cl.[5] F23Q *7/06***

**U.S. Cl. 431—263** **8 Claims**



1. In a barbecue grill having a firebox with a gas burner and ignition means in said firebox for igniting gas supplied to said burner, the improvement comprising:

said ignition means including an electrode and a housing partially enclosing said electrode and defining a ground contact;

said housing having multiple walls that define a generally rectangular chamber having an opening proximate to said gas burner with said opening oriented with respect to the burner;

first and second tabs formed integrally with said housing and received through opening means in said firebox and bent to secure said housing to said firebox; and,

support means in said chamber frictionally engaging said electrode.

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**4,941,818**

**CIGARETTE LIGHTER**

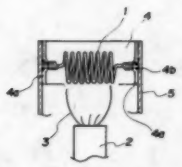
**Kazuhide Ohe, Kamagaya; Kazuo Sato, Ichikawa; Shunpei Fukuda, and Hiroyuki Nakada, both of Tokyo, all of Japan, assignors to TDK Corporation, Tokyo, Japan**

**Filed Nov. 18, 1988, Ser. No. 273,466**

**Claims priority, application Japan, Nov. 21, 1987, 62-177891; Feb. 4, 1988, 63-14249**

**Int. Cl.[5] F23Q *11/00***

**U.S. Cl. 431—268** **12 Claims**



1. A cigarette lighter having a combustor portion ignitable by a fuel gas from a nozzle from which said fuel gas is ejected in a fire bowl of the combustor portion, said cigarette lighter comprising an igniting element made of a wire of platinum metal or a platinum-based material having a diameter of the wire in the range from 0.10 mm to 0.25 mm, of which the pitch of the coil does not exceed 1 mm, said coil being mounted at or near the vicinity of said nozzle from which the fuel gas is ejected in a fire bowl of the combustor portion.

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**4,941,819**

**AIR CIRCULATION AND EXHAUST CONTROL SYSTEM FOR COMMERCIAL OVENS**

**G. Wayne Stewart, Plano; Bill E. Davis, Irving; William M. Thomas, Garland; Michael J. Dobie, Plano, and Carlos Bacigalupe, The Colony, all of Tex., assignors to Stewart Systems, Inc., Plano, Tex.**

**Continuation of Ser. No. 226,893, Aug. 1, 1988, Pat. No. 4,846,647, which is a continuation of Ser. No. 101,841, Sep. 28, 1987, Pat. No. 4,792,303, which is a division of Ser. No. 936,160, Dec. 1, 1986, Pat. No. 4,726,766. This application Apr. 26, 1989, Ser. No. 343,287**

**The portion of the term of this patent subsequent to Dec. 20, 2005, has been disclaimed.**

**Int. Cl.[5] F23J *15/00***

**U.S. Cl. 432—8** **15 Claims**

1. A heated air circulation and exhaust control system for an oven comprising:

means forming an oven enclosure defining an oven interior;

conveyor means for transporting food products through the oven interior along a predetermined spiral path having relatively elongated side portions and curved end portion;

inlet apertures within the oven interior for receiving heated gases;

discharge tubes having outlet apertures situated within the oven interior adjacent to the conveyor path at the curved end portions; and

circulation means coupling said inlet apertures to said discharge tubes for causing the flow of heated gases from the inlet aperture to the outlet apertures of the discharge tubes to heat the food products on the conveyor in the curved end portions.

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**4,941,820**

**PULSE COMBUSTION ENERGY SYSTEM**

**Hanford N. Lockwood, Jr., San Mateo, Calif., assignor to NEA Technologies, Inc., Larkspur, Calif.**

**Continuation of Ser. No. 218,720, Jul. 13, 1988, abandoned, which is a division of Ser. No. 41,794, Apr. 23, 1987, Pat. No. 4,838,784, which is a division of Ser. No. 852,854, Apr. 16, 1986, Pat. No. 4,708,159. This application Oct. 24, 1988, Ser. No. 261,652**

**Int. Cl.[5] F27B *15/00***

**U.S. Cl. 432—58** **23 Claims**

1. A drying apparatus comprising:

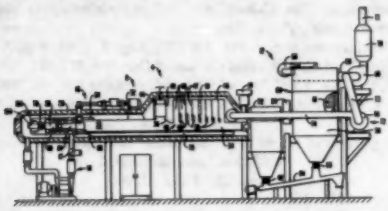
a pulse combustor having a combustion chamber and a generally tubular outlet in fluid communication with the combustion chamber for emitting high temperature pulses;

a processing tube for flowing a foreign material to be processed therethrough, the processing tube having an axis including upstream and downstream ends, the upstream

end being in fluid communication with the outlet of the pulse combustor for receiving the high temperature pluses emitted therefrom;

means for introducing the foreign material to be processed into the high temperature pulses flowing through the upstream end of the processing tube;

means, in fluid communication with the downstream end of the processing tube, for receiving the foreign material flowing therefrom;



means for flowing a separate fluid into the processing tube proximate the upstream end thereof;

means for detecting a prescribed differential pressure through the processing tube; and

means, responsive to the pressure detecting means for modulating the flow of fluid into the upstream end of the processing tube.

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**4,941,821**

**METHOD AND APPARATUS FOR THE HEAT TREATMENT OF FINE-GRAINED MATERIAL**

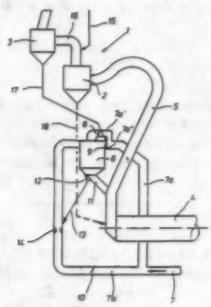
**Manfred Dürr, Oelde; Georg Unland, Ennigerloh; Wolfgang Rother, Oelde; Günter Driemeier, Lienen, and Heinz-Herbert Schmits, Rheda-Wiedenbrück, all of Fed. Rep. of Germany, assignors to Krupp Polysius AG, Fed. Rep. of Germany**

**Filed Jan. 3, 1989, Ser. No. 292,992**

**Claims priority, application Fed. Rep. of Germany, Jan. 14, 1988, 3800895**

**Int. Cl.[5] F27B *15/00, 7/02***

**U.S. Cl. 432—106** **9 Claims**



1. Apparatus for the heat treatment of fine-grained material such as cement, said apparatus comprising material preheater means, a material calcination zone in communication with said preheater means, kiln means in communication with said preheater means to receive material therefrom for final burning of said material, cooling means in communication with said kiln means to receive and cool burnt material, tertiary air supply means extending from said cooling means to said calcination zone to deliver oxygen-rich cooling air thereto, exhaust gas supply means extending from said kiln means to said preheater means to deliver hot exhaust gas thereto, and means for delivering a portion of said material from a selected part of said apparatus to said tertiary air supply means for mixing with said cooling air and recycling to said calcination zone.

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**4,941,822**

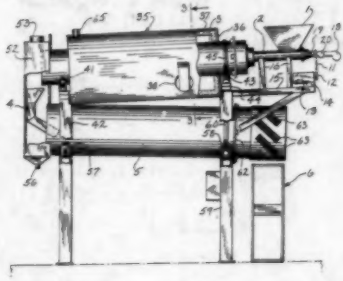
**APPARATUS FOR HEAT TREATING CONTAMINATED PARTICULATE MATERIAL**

**Marvin Evans, 8550 N. Fielding Rd., and David H. Miller, 610 E. Birch Ave., both of Milwaukee, Wis. 53217**

**Filed Jul. 20, 1989, Ser. No. 382,228**

**Int. Cl.[5] F27B *7/08***

**U.S. Cl. 432—112** **21 Claims**



1. An apparatus for heat treating particulate material, comprising a rotary drum having an upstream end and a downstream end, first drive means for rotating said drum, auger means including a cylindrical housing communicating with the upstream end of said drum, said auger means also including a rotatable hollow shaft and a spiral flight mounted on said shaft, feeding means associated with said auger means for feeding a particulate material to said auger means, second drive means for rotating said spiral flight to convey said material through said housing and into said drum, heating means for heating the external surface of the drum, air supply means connected to said hollow shaft for introducing air through said shaft to said drum, and sealing means for sealing said housing to said drum to prevent the escape of gas at the joint between the rotating drum and said housing.

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**4,941,823**

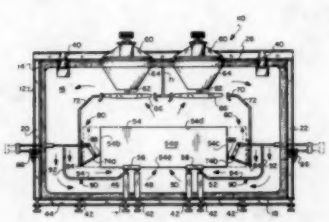
**VERTICAL AIR FLOW INGOT PUSHER FURNACE WITH ADJUSTABLE SIDE BAFFLES**

**Robert H. Ross, Meadville, Pa., assignor to Seco/Warwick Corporation, Meadville, Pa.**

**Filed Dec. 5, 1989, Ser. No. 446,062**

**Int. Cl.[5] F27B *9/04***

**U.S. Cl. 432—152** **7 Claims**



1. An ingot pusher furnace of the vertical air flow type comprising:

an insulating furnace enclosure formed by a bottom wall, a pair of side walls, a front wall, a rear wall and a top wall,

said enclosure receiving a plurality of ingots to be heated whose length is at a minimum acceptable by the furnace;
means for heating said enclosure by heating a gaseous medium therein:
means for moving said gaseous medium within said enclosure:
a pair of vertical fixed side baffles disposed in a parallel, spaced apart relationship to said side walls of said enclosure, each of said vertical fixed side baffles extending from the rear wall of said enclosure to the front wall thereof, each of said vertical fixed side baffles having an upper end and a lower end;
a horizontal baffle having connecting members and extending from said rear wall to said front wall, said connecting members being joined fixedly to respective upper ends of said vertical fixed side baffles;
adjustable side baffles each having its one end pivotally attached to the respective lower ends of said vertical fixed side baffles, said adjustable side baffles being movable between a vertical position and an angled position;
a pair of L-shaped vanes surrounding the ends of the ingots; and
each of said L-shaped vanes including a vertical portion and a horizontal portion, the vertical portion extending vertically and substantially intermediate the respective vertical fixed side baffles and said side walls, the horizontal position being joined integrally at its one end to the vertical portion and extending towards the center of the ingot,
whereby said adjustable side baffles forcing said gaseous medium contained in said enclosure to flow towards the center portions of the ingots when in the angled position so as to provide uniform heating throughout the ingot.

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**4,941,824**

## METHOD OF AND APPARATUS FOR COOLING AND CLEANING THE ROOF AND ENVIRONS OF A COKE OVEN

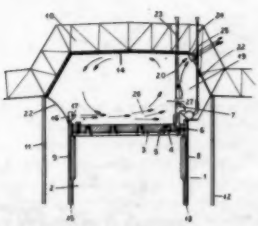
**Heinz Hölter, Beisenstrasse 39-41, D-4390 Gladbeck; Heinrich Igelbüscher, Gladbeck, and Heinrich Gresch, Dortmund-Wickede, all of Fed. Rep. of Germany, assignors to Heinz Hölter, Gladbeck, Fed. Rep. of Germany**

**Filed May 12, 1989, Ser. No. 351,615**

**Claims priority, application Fed. Rep. of Germany, May 13, 1988, 3816463; May 20, 1988, 3817205; Nov. 25, 1988, 3839834**

**Int. Cl.[5] F27D *1/12***

**U.S. Cl. 432—233** **19 Claims**



1. A method of cooling a roof region of a coke oven and maintaining said roof region free from contaminants, comprising the steps of:
(a) enclosing said roof region with a suction housing defining a space with said roof region;
(b) continuously evacuating said space so as to maintain said space at a subatmospheric pressure;
(c) maintaining said space in communication with at least some regions of covered filling openings and regions of coke-oven doors of said coke oven; and
(d) admitting fresh air to said space in a volume substantially equal to gases evacuated from said space.

6. An apparatus for cooling a roof region of a coke oven and maintaining said roof region free from contaminants, comprising:
a suction housing enclosing said roof region and defining a space with said roof region;
means for continuously evacuating said space so as to maintain said space at a subatmospheric pressure;
means for maintaining said space in communication with at least some regions of covered filling openings and regions of coke-oven doors of said coke oven; and
means for admitting fresh air to said space in a volume substantially equal to gases evacuated from said space.

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**4,941,825**

## ORTHODONTIC BRACKET AND LOCK PIN

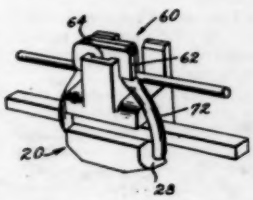
**Harry Lerner, Apartado Postal No. 64753 C.C.C.T., Caracas, Venezuela**

**Continuation-in-part of Ser. No. 96,865, Sep. 15, 1987, Pat. No. 4,838,787. This application Mar. 17, 1989, Ser. No. 324,860**

**The portion of the term of this patent subsequent to Jun. 13, 2006, has been disclaimed.**

**Int. Cl.[5] A61C *3/00***

**U.S. Cl. 433—14** **2 Claims**



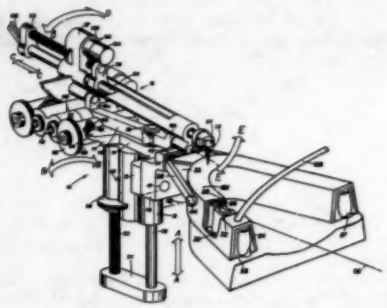

1. An orthodontic bracket device for use with a light wire technique and edgewise correction technique, comprising:
a backing plate for attachment to a tooth band or tooth;
a body portion connected to said backing plate having a frontal slot located therein along a midsection thereof for receipt of an arch wire, said body portion also having a passageway located therethrough which intersects said frontal slot, said passageway extending upwardly through an upwardly protruding portion of said body portion, said upwardly protruding portion being positioned relative to said backing plate so as to create a light wire receiving channel therebetween, said body portion also having a lower portion located immediately beneath said frontal slot;
said light wire receiving channel having a light wire received therein and said passageway having a locking pin means inserted therein for securing said light wire in said light wire receiving channel, said locking pin means having front and back sides and comprising a center shaft member, said center shaft member extending to, but not through, said frontal slot;
said frontal slot having a rectangular arch wire received therein with portions thereof extending beyond said body portion of said bracket device, said arch wire being held securely in said frontal slot by an elastic ligature means, said elastic ligature means permanently secured to said locking pin means for looping around said lower portion of said body portion and riding over said portions of said rectangular arch wire.

4,941,826

## APPARATUS FOR INDIRECT DENTAL MACHINING

William Loran, 100 Thorndale Dr., #356, San Rafael, Calif. 94903, and Merritt A. Robinson, 475 Fawn Dr., San Anselmo, Calif. 94960

Filed Jun. 9, 1988, Ser. No. 204,632
Int. Cl.[5] A61C *3/06*
U.S. Cl. 433—51 12 Claims



1. Apparatus for machining a tooth comprising:
an impression tray;
an elastic and dimensionally stable dental impression material in said tray;
said tray and impression material having been applied to a patient's jaw to form a negative impression thereof;
a positive model of said patient's jaw formed from a negative impression thereof;
a portion of said tray and impression material having been cut away so that when said negative impression is received over a patient's jaw or said positive model, a selected portion of a tooth to be machined is exposed;
a base member;
a rotatable cutter driving member mounted for movement on said base member in at least three degrees of motion;
means for firmly securing said impression tray to said base member;
said impression tray forming anchor means for selectively securing said base member in precisely corresponding positions on said patient's jaw or on said positive model;
recording means operative when said anchor means is secured to said positive mode to record movements of said cutter driving membe relative to said base member in cutting a tooth on said model; and
duplicating means selectively actuated when said anchor means is secured to said patient's jaw to duplicate said recorded movements of said cutter driving member relative to said base member.

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4,941,827

## TOOTH FASTENING PLUG FOR A PATTERN

Heinz Mack, Sudl. Auffahrtsallee 64, 8000 Munich 19, Fed. Rep. of Germany

Filed Mar. 28, 1989, Ser. No. 329,810
Claims priority, application Fed. Rep. of Germany, Mar. 29, 1988, 3810690
Int. Cl.[5] A61C *19/00*
U.S. Cl. 433—74 9 Claims

1. A plug connection for fastening tooth or jaw segments to a pattern base, said connection comprising a pin and a matching sleeve in which the pin is firmly seated and wherefrom it can be separated again by counter-pressure, said pin comprising a permanently lockable locking shank and a detachable plug-in shank, wherein;
the detachable plug-in shank of the pin comprises a coupling regin of larger cross-section and an adjacent coupling region of a cross-section smaller than that of the larger cross-section coupling region, and at least either the larger cross-section coupling region or the smaller cross-section coupling region being of cylindrical configuration,
the sleeve comprising a larger cross-section hollow cylindrical region with an inner diameter corresponding to the cross-section of the larger cross-section coupling region of the pin and a smaller cross-section hollow cylindrical region corresponding to the cross-section of the smaller cross-section coupling region of the pin,

the axial length of the larger cross-section coupling region of the pin being equal to the length of the smaller cross-section hollow cylindrical region of the sleeve, and
the smaller cross-section coupling region of the pin being longer than the larger cross-section coupling of the pin and longer than the smaller cross-section hollow cylindrical region of the sleeve.

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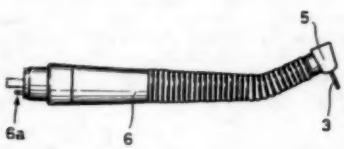
4,941,828

## DENTAL CHUCKLESS HANDPIECE

Hiroshi Kimura, Ibaragi, Japan, assignor to G-C Dental Industrial Corp., Tokyo, Japan

Filed Jun. 30, 1988, Ser. No. 213,925
Claims priority, application Japan, Jul. 22, 1987, 62-181137
Int. Cl.[5] A61C *1/10*
U.S. Cl. 433—114 6 Claims




1. A dental chuckless handpiece of the compressed air drive type, including a body having a head in which bearings are attached to the upper and lower portions of a shaft provided with a turbine impeller, and a rotary member having a cutting tool fixedly provided to the lower end of said shaft is mounted in place through said upper and lower bearings;
at least portions of said body excepting said head being formed of a synthetic resin discriminably colored with a color including transparent color.

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4,941,829

## METHOD FOR PROVIDING A DYNAMIC TUTORIAL DISPLAY

Mark W. Estes, Dallas; Ivan R. Eisen, Flower Mound, and Anthony M. Peters, Bedford, all of Tex., assignors to International Business Machines Corporation, Armonk, N.Y.

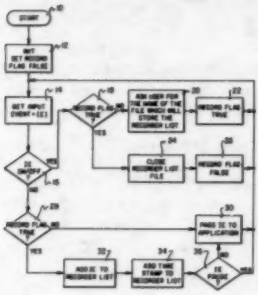
Filed Dec. 23, 1987, Ser. No. 137,399
Int. Cl.[5] G09B *19/00*
U.S. Cl. 434—118 12 Claims

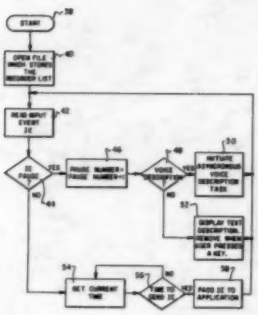
1. A method in a data processing system for training a computer operator in the utilization of an interactive software application, comprising the steps of;

storing a correct sequence of operator inputs to a selected interactive software application, prior to training an operator in the utilization of said selected interactive software application;

permitting said operator to utilize said selected interactive software application;

detecting an operator request for assistance;





determining a selected portion of said stored sequence of operator inputs which is illustrative of the type of assistance requested by the operator; and

coupling said selected portion of said stored sequence of operator inputs to said selected interactive software application in a sequential manner.

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**4,941,830**

## EDGE DESIGN FOR PRINTED CIRCUIT BOARD CONNECTOR

**William J. Tkazyik, Hyde Park, N.Y., and Robert G. Urfer, New Milford, Conn., assignors to International Business Machines Corp., Armonk, N.Y.**

**Filed Aug. 1, 1988, Ser. No. 227,026**
**Int. Cl.[5] H01R 9/09**
**U.S. Cl. 439—59** **6 Claims**

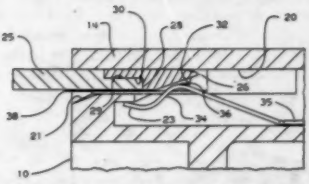
1. An improved printed circuit board and connector comprising:

spring biased members in said connector, each spring biased member being fixed at a trailing end and having a free, leading end which includes a bent, generally arcuate portion;

an electrical contact located toward said trailing end on the arcuate portion of each of said spring biased members such that when its spring biased member is in an undeflected position, said electrical contact is in an impact protected position, and when its spring biased member is in a deflected position, said electrical contact is moved to a contact making position;

a printed circuit on said printed circuit board for forming an electrical circuit;

a nose piece bonded on an edge of said printed circuit board, said nose piece and said printed circuit board edge for insertion into said connector, said nose piece being shaped for providing sliding engagement with said spring biased members along said arcuate bent portions thereof spaced forwardly of the electrical contacts such that sliding engagement between said nose piece and said spring biased members will protect said spring biased members and said



electrical contacts thereon from being damaged by said printed circuit board as said electrical contacts are moved from said impact protected position to said contact making position;

tabs on said printed circuit board electrically connected to said printed circuit, said tabs being adjacent said nose piece and aligned with said spring biased members such that as said spring biased members slide over said nose piece deflecting said spring biased members, said electrical contacts thereon are moved into electrical connection with respective ones of said tabs as said nose piece and said printed circuit board edge are inserted into said connector.

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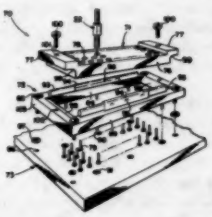
**4,941,831**

## COAXIAL CABLE TERMINATION SYSTEM

**John N. Tengler, Chico, Calif., and John T. Venaleck, Madison, Ohio, assignors to Minnesota Mining and Manufacturing Co., Saint Paul, Minn.**

**Filed May 12, 1986, Ser. No. 862,118**
**Int. Cl.[5] H05K 1/00**
**U.S. Cl. 439—63** **34 Claims**



1. A termination system for coaxial cables that each have a pair of conductors, one being generally centered to the cable relative to the other, and a characteristic impedance, comprising:

a plurality of terminators for respective coaxial cables, each terminator including a center contact connected to the generally centered conductor of the respective cable, an outer sleeve contact connected to the other conductor of the cable, said sleeve contact generally circumscribing said center contact over an axial extent of the terminator, spacer means for maintaining electrical isolation of said center contact and sleeve contact, said center contact, sleeve contact and spacer means being cooperatively

interrelated substantially to match the impedance of the coaxial cable, and strain relief means for mechanically securing the terminator to such coaxial cable;

a common electrically conductive member having plural openings therein for receiving and holding respective terminators while effecting common electrical connection of said sleeve contacts;

a printed circuit board having a top surface and a conductive layer on said top surface; and

means for mounting said common electrically conductive member to said printed circuit board in spaced relation to said conductive layer with at least one hole in said common electrically conductive member partly overlapping a portion of said conductive layer, and at least one of said plurality of terminators being receivedin said one hole with its sleeve contact projecting beneath a bottom surface of said electrically conductive member and into electrical contact with the overlapped portion of said conductive layer.

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**4,941,832**

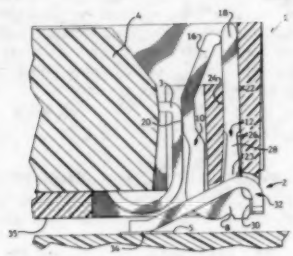
**LOW PROFILE CHIP CARRIER SOCKET**

**Iosif Korsunsky, Harrisburg; Monte L. Kopp, Tower City, and Dimitry G. Grabbe, Middletown, all of Pa., assignors to AMP Incorporated, Harrisburg, Pa.**

**Filed Jan. 30, 1989, Ser. No. 302,305**

**Int. Cl.[5] H01R 9/09**

**U.S. Cl. 439—71** **18 Claims**



1. A chip carrier socket for an integrated circuit chip carrier, the chip carrier comprising a chip carrier body having oppositely facing major surfaces and outwardly facing chip carrier side surfaces which extend normally of the major surfaces, and spaced apart contact pads on the chip carrier side surfaces, the socket comprising a socket body having oppositely facing first and second surface portions, a recess in the first major surface for reception of the chip carrier, the recess having recess side surfaces which extend inwardly from the first major surface, contact receiving cavities in the socket body in surrounding relationship to the recess, each cavity having opposed sidewalls extending inwardly from the adjacent recess side surface and an inner end surface which is remote from the recess side surface, a contact terminal in each of the cavities, each terminal having a chip carrier contacting portion for contacting a respective contact pad on the chip carrier, the chip carrier socket comprising:

each contact terminal has a substrate contacting portion provided proximate to the second major surface, the substrate contacting portion having a contact leg which extends from the chip carrier contacting portion, the contact leg being formed so that the contact leg extends in a plane which is essentially parallel to the plane of the chip carrier contacting portion, the contact leg having a substrate engagement surface provided at a free end thereof;

each contact leg has an engagement means provided thereon, the engagement means extends from the contact leg toward the chip carrier contacting portion, a free end of the engagement means is provided in physical engagement with the chip carrier contacting portion;

whereby as the chip carrier socket is placed in electrical engagement with the substrate, the substrate engagement surfaces of the contact legs of the terminals engage conductive traces of a printed circuit board, causing contact legs to move to a stressed position, thereby causing the engagement means to frictionally slide across chip carrier contacting portion.

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**4,941,833**

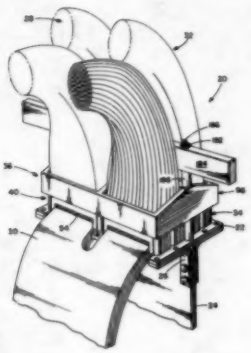
**CONTROLLED IMPEDANCE PLUG AND RECEPTACLE**

**Rocco Noschese, Wilton, Conn., and Michael Lazar, White Plains, N.Y., assignors to Burndy Corporation, Norwalk, Conn.**

**Filed Oct. 6, 1988, Ser. No. 254,436**

**Int. Cl.[5] H01R 4/66**

**U.S. Cl. 439—92** **28 Claims**



3. A controlled impedance connector assembly comprising:

a receptacle including:

a backup plate;

a metalized grounding block mounted on said backup plate having a plurality of spaced parallel terminal receiving bores therein;

insulation plate means fixed to said grounding block having a plurality of contact receiving bores therein, each in communication with an associated terminal receiving bore in said grounding block; and

a plurality of pin contacts fixed to said insulation plate means, each of said pin contacts extending through an associated one of the contact receiving bores therein, each including a head member extending into an associated terminal receiving bore in said grounding block and an oppositely directed tail member for termination at available circuitry; and

a plug matingly engageable with said receptacle including:

a plurality of dielectric segments, each having a front face and a rear face and a plurality of parallel spaced terminal receiving bores therein extending from said front face to said rear face;

a plurality of coaxial leads, each including a terminal mounted at an extremity thereof removably fixed in an associated terminal receiving bore of said dielectric segment;

a frame for mounting said dielectric segments as a unit, said frame extending between a front side and a rear side and defining a plurality of compartments therein, each for supportively receiving at least one of said dielectric segments therein, the dimensions of each of said compartments being slightly larger than its associated one of said dielectric segments; and

mounting means for mounting said dielectric segments to said frame so as to permit freedom of movement of said dielectric segments relative to said frame within defined limits in directions transverse to the axes of the terminal receiving bores therein;

whereby when said plug is matingly engaged with said receptacle, each of said terminals extends into an associated terminal receiving bore within said grounding block and is fittingly engaged with said grounding block and is coupled to an associated one of said pin contacts, the freedom of movement among said dielectric segments assuring mating engagement of all of said terminals in said plug with the associated terminal receiving bores and with said associated pin contacts of said receptacle.

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**4,941,834**

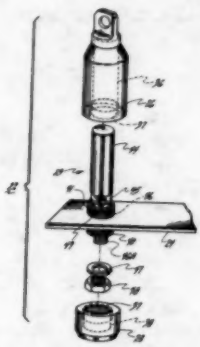
## UNIVERSAL HIGH VOLTAGE GROUND STUD INSULATING SYSTEM

**John DeLeo, 107 Sun Valley Dr., Southington, Conn. 06489**

**Filed Feb. 8, 1990, Ser. No. 476,692**

**Int. Cl.[5] H01R** *4/66, 4/70*

**U.S. Cl. 439—92** **9 Claims**



1. A universal ground stud insulating system comprising in combination:

a first insulative cylinder having a first hollow channel at least part way along an interior of said first cylinder, said first channel terminating at one end having first internal threads formed therein;

a second insulative cylinder having a second hollow channel at least part way along an interior of said second cylinder, said second channel terminating at one end having second internal threads formed therein;

a first washer having threads formed on an exterior surface thereof and arranged for engaging said first cylinder threads; and

a second washer having threads formed on an exterior surface thereof and arranged for engaging said second cylinder threads.

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**4,941,835**

## MACHINE-PLUGGABLE ELECTRONIC PACKAGE HAVING A MECHANICAL INTERLOCK

**Casimir Lasmayoux, La Colle sur Loup, and Antoine Pantani, Vence, both of France, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 14, 1989, Ser. No. 322,964**

**Claims priority, application France, Mar. 15, 1988, 88 480009**

**Int. Cl.[5] H01R** *13/00*

**U.S. Cl. 439—152** **7 Claims**

1. An electronic package adapted to be connected to a machine and to an external connector, said machine having a cavity therein for receiving said package, a first electrical connector for connection to said package, and first and second locking means extending into said cavity, said first electrical connector being located at one end of said cavity, said package comprising:

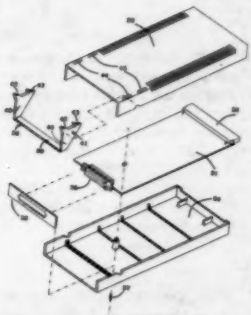
a housing of a shape adapted to fit into said cavity;

a printed circuit board mounted within said housing and having electronic components thereon;

a second electrical connector mounted at one end of said housing and being connected to said printed circuit board, said second electrical connector being adapted to mate with said first electrical connector upon said package being inserted into said cavity;

a third electrical connector mounted on said housing at another end thereof and being adapted to mate with said external electrical connector to establish an electrical connection between said package and equipment outside said machine;

and a lever mounted on said housing and being movable between first and second positions, said lever having first and second lever locking means, and first lever locking



means being adapted to engage said first locking means on said machine and move said package in said cavity so as to engage said first and second electrical connectors upon movement of said lever from said first position to sid second position, said first lever locking means being operative to prevent sid package from being removed from said machine while said lever is in said second position, said second lever locking means being adapted to engage said second locking means on said machine upon movement of said lever from said second position to said first position and disengage said first and second electrical connectors, said lever having a portion located adjacent to said third electrical connector when sid lever is in said second position which portion is adapted to engage said external connector and prevent said lever from being moved from said second position when said third electrical connector is connected to said external connector, and thereby prevent said package from being removed from said machine without first disengaging said external connector.

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**4,941,836**

## CONNECTOR HOUSING WITH MOVABLE TERMINALS

**Peter Bernuth, Bensheim, Fed. Rep. of Germany, assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Mar. 8, 1989, Ser. No. 320,676**

**Claims priority, application United Kingdom, May 5, 1988, 8810590**

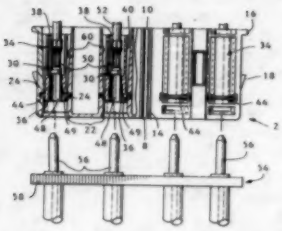
**Int. Cl.[5] H01R** *13/629*

**U.S. Cl. 439—247** **11 Claims**

1. An electrical connector for use with a mating electrical connector, the electrical connector comprising a first major surface and an oppositely facing second major surface, a con-

nector mating surface is provided at one end of the connector and extends between the first and the second major surfaces, a wire receiving surface is provided at the opposite end of the connector and extends between the first and the second major surfaces, connector openings are positioned in the connector and extend between the connector mating surface and the wire receiving surface, the electrical connector being characterized in that:

terminals are positioned in the connector openings, the dimensions of the connector openings being greater than the



dimensions of the terminals, the terminals have mounting means which cooperate with the walls of the connector openings to secure the terminals in the connector openings while allowing the terminals to move relative to the walls of the connector openings,

channels are provided which extend from the first major surface of the electrical connector to the connector openings of the electrical connector, the channels being dimensioned to allow the mounting means to be inserted therethrough into the openings.

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**4,941,837**

**ELECTRICAL CONNECTOR**

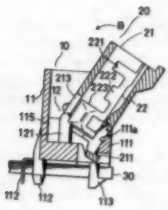
**Masahiko Nakamura, Kitakatsuragi, Japan, assignor to Hosiden Electronics Co., Ltd., Osaka, Japan**

**Filed Jun. 8, 1989, Ser. No. 364,334**

**Claims priority, application Japan, Jun. 17, 1988, 63-80989[U]**

**Int. Cl.[5] H01R *13/64***

**U.S. Cl. 439—341** **2 Claims**



1. A socket and plug coupling assembly comprising:

a socket member of box-like shape having a bottom, two side walls, a rear wall, and a partial front wall adjacent the bottom forming a brace, said socket member including a plurality of contact pins mounted on the bottom and extending upwardly therewithin, said socket member being formed with an inner surface of said brace having a slope inclined downwardly toward said pins, and having at least one opening formed in the bottom adjacent said brace; and

a plug member of a box-like shape and a size fitting to an interior space of said socket member, said plug member having a plurality of openings formed in a bottom and front wall thereof corresponding in position to said contact pins of said socket member, contact means affixed to a rear wall within said plug member adjacent said openings, said plug member rear wall being formed with at least one hook-like nail member extending downwardly and having a distal end portion projecting outwardly, at a position corresponding to said at least one opening in said socket member bottom;

said socket and plug coupling assembly being removably assembled by moving said plug member nail obliquely in contact with said brace inner inclined surface to enter said socket member bottom at least one opening, and then turning the plug inwardly of said socket member such that said socket member contact pins enter said plurality of openings to engage the contact means therewithin, said nail distal end portion thereby engaging a bottom edge of said brace.

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**4,941,838**

**ELECTRIC PLUG AND SOCKET CONNECTOR**

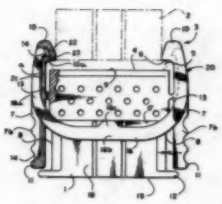
**Bernd Zinn, Ennepetal, Fed. Rep. of Germany, assignor to Grote & Hartmann GmbH & Co. KG, Fed. Rep. of Germany**

**Filed Nov. 29, 1988, Ser. No. 277,140**

**Claims priority, application Fed. Rep. of Germany, Nov. 30, 1987, 3740580**

**Int. Cl.[5] H01R *13/627***

**U.S. Cl. 439—350** **10 Claims**



1. In a lockable electric plug and socket connector with a plug enclosure with compartments for several plug contact elements and a mating plug enclosure with compartments for several mating plug contact elements as well as a snap action locking device for locking the two enclosures with catch noses on the plug enclosure and a U-shaped spring clip mounted on the plug enclosure for cooperation with the catch noses, and a catch edge on the mating plug enclosure so the catch noses can lock behind the catch edge, and with an unlocking tab that acts on the spring clip to unlock the enclosures, the improvement comprising:

two toggle levers provided and formed in one piece on the front sides of the plug enclosure;

the spring clip is a sheet metal part punched from sheet metal and placed on its edge so the spring clip acts on a toggle lever to urge the toggle levers to a locked position, and the catch noses are located on the toggle lever;

the plug enclosure having front sides and the plug having a front characterized in that the width of each toggle lever corresponds approximately to the width of the front sides;

each toggle lever is somewhat longer than the front sides and has a catch noise projecting over the plug front so that the end of the toggle lever opposite the catch noses ends just above a base bulge formed on the plug enclosure opposite the front thereof; and

the toggle levers are positioned a distance away from the front sides of the plug enclosure and are each connected to the plug enclosure by a crosspiece which forms the mount of the toggle lever and is located approximately in the middle of the toggle lever in the longitudinal direction, so the toggle lever is subdivided into a catch lever arm and an unlocking lever arm which forms the unlocking tab.

4,941,839

## DOUBLE LOCKING DEVICE FOR CONNECTOR

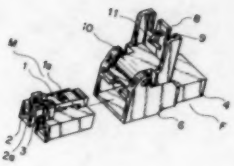
Yasuhiro Nagasaka; Tsuneo Shiga; Kazuyuki Shiraki, all of Toyota; Akira Maeda, Shizuoka; Shigemi Hashizawa, Shizuoka, and Kazuto Ohtaka, Shizuoka, all of Japan, assignors to Yazaki Corporation, Tokyo, Japan

Continuation-in-part of Ser. No. 358,119, May 30, 1989, abandoned. This application Sep. 22, 1989, Ser. No. 411,151

Claims priority, application Japan, May 30, 1988, 63-70299; Sep. 27, 1988, 63-125093[U]

Int. Cl.[5] H01R *13/639*

U.S. Cl. 439—352 7 Claims



1. A double locking device in a connector including a mating pair of a first housing and a second housing with respective terminals accommodated for electrical connection therein, said first and second housings having a first-step locking means engageable with each other, said double locking device comprising:

auxiliary lock means including first auxiliary locking means and second auxiliary locking means, said first auxiliary locking means being pivotably mounted on said first housing and having means normally biasing said first auxiliary locking means to be erected on said first housing, said second auxiliary locking means being secured in said second housing, said first auxiliary locking means being adapted to be manually rotated against the biasing means to be brought into an engagement with the second locking member for a second-step lock of the connector when the first housing and the second housing have been completely engaged with each other for the first-step lock.

4,941,840

## CIRCUIT BOARD MOUNTING APPARATUS

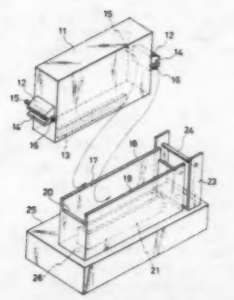
Kazuo Okada, Kamakura, Japan, assignor to Universal Co., Ltd., Oyama, Japan

Filed Nov. 22, 1988, Ser. No. 274,284

Claims priority, application Japan, Dec. 11, 1987, 62-188525

Int. Cl.[5] H01R *13/629*

U.S. Cl. 439—376 9 Claims



1. A circuit board mounting apparatus comprising:

a rectangular case including a circuit board, said case having an extending portion on at least a leading end, projections on opposite sides of the extending portion and a circuit board terminal projecting out of a bottom of said case;

a holding member for receiving and holding said case, said holding member having an opening on an upper surface thereof and an inside connector for connecting with said terminal; and

a supporting member positioned adjacent a rear end of said holding member, said supporting member having pivoting means for pivoting said extending portion of said case;

said projections of said case being slidable along upper edges of said holding member;

said extending portion having means for engaging said pivoting means of said supporting member when said projections slide along the upper edges to the rear end of said holding member while tilting said case, whereby said case is detachably mounted onto said holding member.

4,941,841

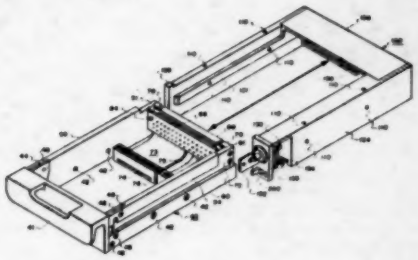
## ADAPTER AND A REMOVABLE SLIDE-IN CARTRIDGE FOR AN INFORMATION STORAGE SYSTEM

Julius C. Darden, 1733 Calle Artigas, Thousand Oaks, Calif. 91360; Miguel M. Praca, 21 Thornton Ave. #3, Venice, Calif. 90291, and Philip J. Tomasi, 205 Pepper St., Newbury Park, Calif. 91320

Continuation-in-part of Ser. No. 204,456, Jun. 9, 1988, abandoned. This application Sep. 11, 1989, Ser. No. 406,197

Int. Cl.[5] H01R *13/629*

U.S. Cl. 439—377 4 Claims



3. In combination with a computer housing, said computer housing having a port for receiving a disk drive apparatus, said disk drive apparatus comprising:

a support bracket separably mounted within said port and electrically connected to said computer housing, said support bracket being bifurcated defining a pair of spaced apart legs, each said leg having an inner surface with said inner surfaces located in a facing relationship to each other, a first electrical connector mounted on said support bracket;

a cartridge, said cartridge defining a box-like frame enclosing an open space, said open space having an open top and an open bottom, a second electrical connector mounted to said box-like frame and located within said open space, a third electrical connector mounted on said box-like frame, said cartridge having side walls, each said side wall having an exterior surface, said cartridge to be located between said legs of said support bracket in a closely conforming manner, said cartridge to be readily removable from said support bracket and be separated therefrom, and when said cartridge is fully inserted in position between said legs said third electrical connector is electrically connected with said first electrical connector;

a disk drive being fixedly mounted by mounting means to said cartridge, said disk drive being wholly contained within said open space, said disk drive being electrically connected to said second electrical connector, said second

electrical connector being electrically connected to said third electrical connector; and

a cooperating guide rail arrangement and track arrangement mounted on said exterior surface of each said side wall of said cartridge and said inner surface of each said leg of said supporting bracket, said guide rail arrangement and said track arrangement permitting only longitudinal movement between said cartridge and said support bracket and insures that positive electrical connection is always produced between said third electrical connector and said first electrical connector when said cartridge is fully inserted within said support bracket.

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**4,941,842**

**BOARD-IN TYPE CONTACT-CONNECTORS**

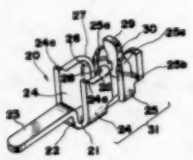
**Terumi Nakashima, Takatsukishi, and Takeshi Tanaka, Minoh-shi, both of Japan, assignors to Nippon Acchakutanshi Seizo Kabushiki Kaisha, Osaka, Japan**

**Filed Jun. 6, 1989, Ser. No. 362,044**

**Claims priority, application Japan, Jun. 10, 1988, 63-77383**

**Int. Cl.[5] H01R *4/24***

**U.S. Cl. 439—399** **5 Claims**



1. A board-in type contact-connector comprising:

an insulating housing means including a plurality of recess means;

a pluarlity of contacts adapted to be separately received in the recess means of said insulating housing means, each of said contacts including a bottom plate, a beak portion defining a first end of the contact adapted to be received in a printed circuit board, said beak portion projecting from the bottom plate through a raised portion whereby said beak portion is disposed in a longitudinally extending plane spaced from a longitudinally extending plane of the bottom plate, spaced sidewalls provided on respective sides of the bottom plate in an area of the raised portion, and wire connecting means for connecting a wire to the contact including a first pair of oppositely disposed spaced contacting strap means respectively provided on said sidewalls at a position axially spaced from said raised portion for defining a first wire-receiving slot, a second pair of oppositely disposed spaced connecting strap means disposed on said bottom plate for defining a second end of the contact and a second wire receiving slot aligned with said first wire receiving slot, and a pair of oppositely disposed spaced tab means provided on respective sides of said bottom plate interposed between and axially spaced from said first and second paris of connecting strap means, said tab means being adapted to be crimped so as to crimp the wire received in the first and second wire-receiving slots, and wherein means are provided on said tab means for preventing an application of a mechanical load on the wire thereby insuring a firm connection between the wire and the contact.

**4,941,843**

**ELECTRICAL TRUNKLINE SYSTEM**

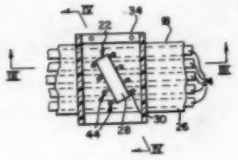
**Immo E. Bock, Randburg; Philip L. Nathan, Senderwood, and Peter O. Malpage, Norwood, all of South Africa, assignors to Johannesburg Construction Corporation (Proprietary) Limited, Johannesburg, South Africa**

**Division of Ser. No. 233,214, Aug. 17, 1988. This application Nov. 13, 1989, Ser. No. 435,727**

**Claims priority, application South Africa, Aug. 18, 1987, 87/6093**

**Int. Cl.[5] H01R *4/24***

**U.S. Cl. 439—425** **20 Claims**



8. A connector for electrically connecting an electrical device to a cable at any desired position along its length, the cable being flat and ribbon-like and having a plurality of conducting cores arranged next to and spaced from one another in a substantially planar manner with an electrically insulating material covering the cores and filling the spaces between them, which includes

a first member and a second member which have complementary locking formations for locking the members together, with the cable being receivable between the members;

at least one staple-like piercing and contacting element carried by the first member for piercing the insulating material and making electrical contact with a selected one of the cores; and

a length of wire having one end electrically connected to the piercing and contacting element.

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**4,941,844**

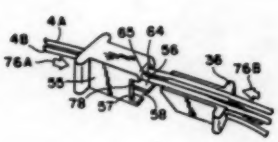
**ELECTRICAL CONNECTOR**

**Wesley E. Bowden, and Michael D. Swan, both of Emporia, Kans., assignors to Hopkins Manufacturing Corporation, Emporia, Kans.**

**Filed Oct. 14, 1988, Ser. No. 258,021**

**Int. Cl.[5] H01R *4/24***

**U.S. Cl. 439—425** **6 Claims**



1. An electrical connector comprising:

a base having a body and a first insulated electrical wire extending to the body and having one of its ends partially embedded therein, the body having an alignment rib axially extending outwardly therefrom at one end thereof, and including at least one camming groove extending therethrough along a top surface thereof;

a terminal pin on the embedded end of the first wire at least partially extending into the groove;

a second insulated wire at least partially received in and extending through the groove to extend outwardly in

opposite directions from both ends of the base body, with the terminal pin extending into the groove;

means to engage the second insulated wire received in the groove including the groove in the body having a cantilevered end section and having shoulders axially spaced therealong to assist in holding the second wire within the groove until electrical connection is made; and

a cap having a top wall, two spaced sidewalls extending downwardly from the top wall, a first end adapted to slidingly receive the base body, a second end having a restricted opening therein through which the second wire can extend when the connection is made, and two bottom flanges extending inwardly toward one another from the sidewalls to form a bottom slot, wherein said top wall, sidewalls and bottom flanges of the cap cooperatively define a cavity therewithin selectively to receive the base body;

said cap having a camming ramp thereon and the camming groove extending axially along the top wall of the cap from the first end thereof to the camming ramp, the camming groove and ramp facing inwardly toward the cavity, the cap being adapted to slidingly receive the base body and to partially surround the second insulated wire during relative movement therebetween, with the camming ramp slidingly contacting the second insulated wire during relative movement therebetween to force the same into an insulation displaced connection with the terminal pin.

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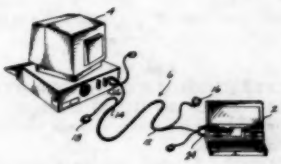
**4,941,845**

## DATA TRANSFER CABLE

**Mark Eppley, Bothell, and Peter B. Rysavy, Seattle, both of Wash., assignors to Traveling Software, Inc., Bothell, Wash.**

**Filed Jun. 7, 1989, Ser. No. 362,703**
**Int. Cl.[5] H01R *11/03***
**U.S. Cl. 439—505** **6 Claims**



1. A cable assembly for use for transferring data between computers and/or associated devices comprising:

a pair of cables, each cable having a connector at its opposite ends for attachment to a computer or an associated device,

the connectors on one cable constructed to permit the transfer of data in parallel,

the connectors on the other cable constructed to permit the transfer of data serially,

means for holding said cables together for a portion of the distance along their lengths,

additional cables electrically connected to said serial connectors and shorter in length than the cables in said pair of cables, and

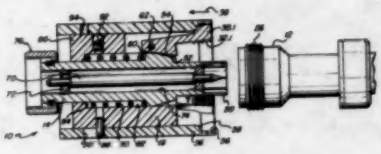
a serial connector on the free end of each of said additional cables.

**4,941,846**

## QUICK CONNECT/DISCONNECT MICROWAVE CONNECTOR

**Ronald Guimond, Amesbury; Anthony Martiniello, Wilmington; David W. Hardy, Rowley, all of Mass., and Raymond Tellier, Salem, N.H., assignors to Adams-Russell Electronic Company, Inc., Amesbury, Mass.**

**Filed May 31, 1989, Ser. No. 359,161**
**Int. Cl.[5] H01R *17/18***
**U.S. Cl. 439—578** **14 Claims**



1. A microwave connector for quick connection to and disconnection from a microwave coupling having externally facing ridges, comprising:

a housing body;

a microwave line segment having a conductor that terminates at a forward end, said microwave line segment being mounted to the housing body and being movable relative thereto between forward and rearward positions;

the forward end of the microwave line segment being shaped so as to be able to be pushed onto the microwave coupling to establish a microwave connection between the microwave line segment and the microwave coupling;

said housing body having a plurality of fingers with inwardly-facing ridge portions that interlock with the externally-facing ridges on the microwave coupling, said fingers being moveable from an open position to an interlock position that is towards the microwave line segment, with the space between the fingers being sufficient to receive the microwave coupling to enable it to establish a microwave connection with the microwave line segment while bringing the externally-facing ridges in juxtaposed relationship with the ridges on the fingers;

an outer sleeve mounted over the housing body and its fingers and being moveable relative thereto in forward and rearward directions, said sleeve having an inwardly-facing cam surface that in one rearward position of the sleeve enables the fingers to move to their open positions and in another forward position forces the fingers to move inwardly so that their inwardly-facing ridge portion interlock with the externally-facing ridges of a microwave coupling that is in microwave connection with the microwave line segment;

means for biasing the microwave line segment towards its forward position with respect to the outer sleeve and said fingers towards their open position;

the forward end of the microwave line segment being located so as to form an abutting microwave connection when forward motion of the sleeve causes the fingers to become interlocked with the ridges on a microwave coupling;

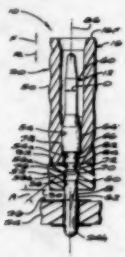
whereby said microwave connector can be quickly-connected to and quickly disconnected from the microwave coupling by respectively pushing and pulling on the outer sleeve.

**4,941,847**

## ELECTRICAL CONNECTOR CONTACT RETENTION SYSTEM

**David E. Welsh, Tustin, Calif., assignor to ITT Corporation, New York, N.Y.**

**Filed Jul. 24, 1989, Ser. No. 384,579**
**Int. Cl.[5] H01R *13/424***
**U.S. Cl. 439—595** **5 Claims**



1. In an electrical first connector which includes a housing holding a plurality of first contacts for mating with the contacts of another connector, the improvement wherein:

said housing includes first and second layers, each formed of an insulative material, said layers having a plurality of aligned contact-receiving holes;

said first contacts lie in said aligned holes of said housing layers, and each contact includes a forward mating portion and a rearward tail portion, and each contact includes a rearwardly-facing first shoulder and a forwardly-facing second shoulder;

said first layer being formed of rigid insulative material and each hole therein having a forwardly-facing abutment that abuts said first shoulder of one of said contacts, to withstand mating forces on the contact;

said second layer being formed of elastomeric material and each hole therein having a rearwardly-facing abutment that engages said second shoulder of one of said contacts.

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**4,941,848**

## SHIELDED PLUG JACK CONNECTOR

**Walter M. Philippson, Woodside; Robert J. Brennan, Ossining, and Terrence Meighen, Stormville, all of N.Y., assignors to Stewart Stamping Corp., Glenrock, Pa.**

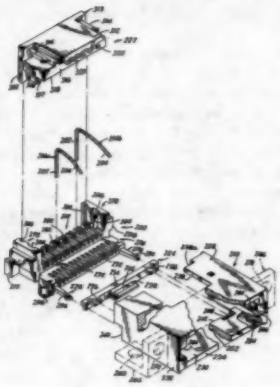
**Continuation-in-part of Ser. No. 247,878, Sep. 22, 1987, Pat. No. 4,889,503, which is a division of Ser. No. 800,679, Nov. 22, 1985, Pat. No. 4,781,623, which is a continuation-in-part of Ser. No. 655,696, Sep. 28, 1984, Pat. No. 4,653,837, which is a continuation-in-part of Ser. No. 612,722, May 21, 1984, Pat. No. 4,641,901, which is a continuation-in-part of Ser. No. 570,806, Jan. 16, 1984, Pat. No. 4,537,459. This application May 22, 1989, Ser. No. 354,999**
**Int. Cl.[5] H01R *13/658***
**U.S. Cl. 439—607** **1 Claim**

1. A modular jack adapted for connection to a printed circuit board and to a plug having cable shield terminating means, comprising:

a jack housing formed of a plurality of jack parts adapted to lockingly interfit with each other to define an elongated receptacle for receiving the plug, the receptacle having an entrance opening at one end of the housing;

a first one of said plurality of jack parts constituting a grounding and shielding part formed of electrically conductive material and having top, bottom and side wails defining a closed, sleeve-like member, each of said walls having a longitudinally extending inner surface at least a substantial portion of which bounds said plug receptacle such that a substantial portion of the length of said elongated receptacle is bounded on all of its sides by the electrically conductive material of said grounding and shielding part;

a second one of said plurality of jack parts constituting a contact guide part in which jack contact guide means are formed for receiving and guiding corresponding portions of respective jack contacts, said jack contact guide means including a first set of vertical surfaces situated in a common plane and a second set of vertical surfaces situated in another common plane, said pin portions of respective said jack contacts abutting against respective ones of said vertical surfaces, and a plurality of channels formed in a top surface of said contact guide parts, each channel communicating with a respective said vertical surface for receiving a portion of a respective jack contact;



a third one of said plurality of said jack parts constituting a contact fixing part including a planar portion overlying said top surface of said contact guide part to confine the jack contact portions within said guide channels, and vertical surfaces abutting against said jack contact pin portions which abut against said first and second vertical surfaces of said contact guide part; and

a plurality of jack contacts, each contact having a first pin portion including a part extending externally of the housing adapted for connection to a printed circuit board and a second contact portion extending into said receptacle adapted for engagement by a contact of the plug.

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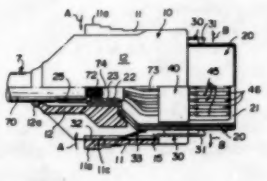
**4,941,849**

## SHIELDED ELECTRICAL CONNECTOR HAVING AN INSULATING COVER ON THE SHIELDING MEMBER

**Yoshitsugu Fujiura, Tokyo, Japan, assignor to AMP Incorporated, Harrisburg, Pa.**

**Filed Jul. 13, 1988, Ser. No. 234,998**
**Claims priority, application Japan, Dec. 12, 1986, 61-296525; PCT Int'l Appl., Nov. 16, 1987, PCT/US87/02983**
**Int. Cl.[5] H01R *9/03***
**U.S. Cl. 439—610** **7 Claims**



1. A shielded electrical connector comprising an insulating

housing having electrical contacts secured in the housing, the electrical contacts having contact portions and conductor-connection portions for electrical connection to insulated electrical conductors of a shielded cable, a shielding member covering the insulating housing and for electrical connection with a shield of the cable, an insulating cover positioned on the shielding member, characterized in that:

said insulating cover has flexible arms and openings extending along respective sides between the shielding member and the insulating cover;

latching members having sections positioned respectively in said flexible arms and in said openings and latching sections extending forwardly from said insulating cover for latching engagement with latching sections of a matable electrical connector; and

fulcrums provided between the latching members and the shielding member enabling the sections and latching sections to move toward and away from the shielding member.

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**4,941,850**

## SHIELDED CABLE CONNECTOR

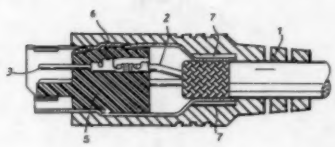
**Malcolm D. Ankers, 64 Mount Avenue, Worksop, Notts., S81 7JL., and Roy E. Weston, 144 Stanton Road, Sandiacre, Notts., NG10 5EP, both of England**

**Filed Jan. 25, 1989, Ser. No. 301,812**

**Claims priority, application United Kingdom, Feb. 8, 1988, 8802801**

**Int. Cl.[5] H01R** *13/648, 43/04*

**U.S. Cl. 439—610** **6 Claims**



1. A cable connector construction comprising a body of insulating material provided with a number of bores each receiving an electrical contact attached to an end of an insulated electrical conductor extending from a cable; a seamless tube of ferromagnetic material of substantially uniform cross-sectional area which receives the body within its bore with the cable extending from one end of the tube, said one end of the tube being collapsed on to itself and directly on to the cable surface so as to form a plurality of radial fins whereby to form a seal at said one end of the tube between the inner periphery of the tube and the outer periphery of the cable.

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**4,941,851**

## FUSE HOLDER FOR FLAT-TYPE FUSE BLOCK

**Fu-Cheng Hsueh, No. 1045, Jen-Ai Tsun, Jen-Te Hsiang, Tainan Hsien, Taiwan**

**Filed Aug. 15, 1989, Ser. No. 394,047**

**Int. Cl.[5] H01R** *13/08*

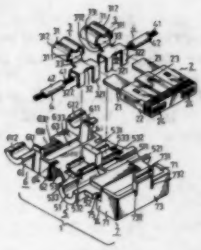
**U.S. Cl. 439—621** **5 Claims**

1. A fuse holder for connecting a flat-type fuse block between a pair of wires, said flat-type fuse block having a flat plastic body, a pair of juxtaposed, laterally spaced co-planar, parallel and generally flat male terminals, and a fusible element disposed inside said flat body which interconnects said pair of male terminals, said fuse holder comprising:

a housing of insulating material including a bottom wall which has an intermediate first channel member extending from one end thereof to another opposite end thereof and opening at both ends thereof, a first partition provided transversely in said first channel member, a second partition provided on said bottom wall adjacent to said first channel member and aligned with said first partition, and two clip seats respectively provided on said bottom wall at two sides of said second partition and raised to a position relative to said first channel member, said bottom wall further having first and second hinged ends extending along the direction of said first channel member, said first hinged end being adjacent to said clip seat and opposite said second hinged end;

a pair of female terminals each of which has a first resilient clip portion placed on each of said clip seats and a second clip portion extending from said first resilient clip portion into said first channel member, each of said first resilient clip portions having an access opening which is directed toward said first channel member;

said housing further having a rear cover portion, hinged to said first hinged end, which houses and clamps said female terminals cooperatively with said bottom wall when said



rear cover portion is turned upward to a closed position, said rear cover portion having a second channel member which is mated with said first channel member to define a bore with two open ends forming an access to said second clip portion;

said housing further having a front cover portion which is hinged to said second hinged end, said front cover portion cooperatively confining, with said bottom wall, a chamber for receiving said flat body of said flat-type fuse block when said front cover portion is turned upward to a closed position;

means for releasably locking said rear cover portion against said bottom wall, said locking means being interlocked when said rear cover portion is depressed against said bottom wall; and

means for releasably fastening said rear and front cover portions.

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**4,941,852**

## TERMINAL FOR BALLAST BOBBIN

**Larry J. Costa, Danville, Ill., assignor to Valmont Industries, Inc., Valley, Nebr.**

**Filed Feb. 27, 1989, Ser. No. 315,492**

**Int. Cl.[5] H01R** *13/40*

**U.S. Cl. 439—733** **2 Claims**

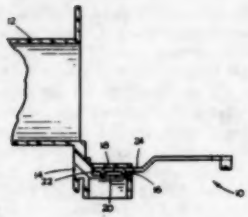
1. A terminal for insertion into a bobbin pocket, comprising:

a substantially flat, resilient electrically conductive terminal member having a forward end for insertion forwardly into the bobbin pocket, a rearward end, an upper face and a lower face, a forward portion which will be received within the bobbin pocket, and a rearward portion which will project rearwardly out of the bobbin pocket;

said forward portion having a notch formed in each side edge thereof, each notch having a forward edge;

a tooth bent downwardly and rearwardly along each side edge

forwardly of said notches with the forward edge of the notch forming the lower leading edge of the projecting



tooth, said leading edge having a sharp burr protruding therefrom for gripping a wall of the pocket.

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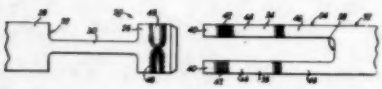
**4,941,853**

**ELECTRICAL CONTACT TORSION BAR SYSTEMS**

**Frank A. Harwath, Downers Grove, Ill., assignor to Molex Incorporated, Lisle, Ill.**

**Filed Sep. 12, 1989, Ser. No. 406,201**
**Int. Cl.[5] H01R *11/22***
**U.S. Cl. 439—848** **15 Claims**



1. An electrical contact system comprising:

first and second electrical terminals relatively movable in an axial direction into engagement with one another;

said first terminal including a contact portion engageable with said second terminal, a reaction portion spaced in the axial direction from said contact portion and a spring portion connected between said reaction portion and said contact portion; and

said second terminal including contact means engageable with said contact portion of said first terminal for displacing said contact portion relative to said reaction portion and flexing said spring portion to maintain a contact force between said contact portion and said contact means;

the contact system being characterized by:

said spring portion comprising a torsion bar extending at least partly in the axial direction;

said torsion bar coinciding with the central axis of said first terminal; and

said contact portion being a blade symmetrical about said central axis and being displaced in an arcuate path around an axis of rotation extending in said axial direction in response to engagement by said contact means.

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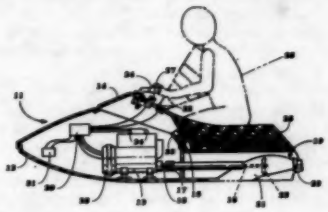
**4,941,854**

**BOARDING SENSOR AND CONTROLLER FOR SMALL WATERCRAFT**

**Hideharu Takahashi, and Yoshiaki Uchida, both of Hamamatsu, Japan, assignors to Sanshin Kogyo Kabushiki Kaisha, Hamamatsu, Japan**

**Filed Nov. 25, 1988, Ser. No. 276,065**
**Claims priority, application Japan, Nov. 27, 1987, 62-297827; May 23, 1988, 63-123954**
**Int. Cl.[5] B60K *28/00*; B63H *19/00***
**U.S. Cl. 440—1** **18 Claims**

1. A boarding sensor and control means for small watercraft powered by an engine and having a steering mechanism wherein said boarding sensor comprises a reflection sensor which outputs a non-boarding signal to said control means when a driver is not within a detection area of said reflection sensor and said control means regulates navigation of said



watercraft by decelerating said engine to an idle and being adapted to operate said watercraft steering mechanism to return said watercraft to a fallen driver.

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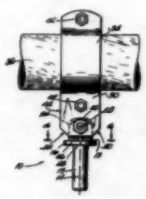
**4,941,855**

**OARLOCK**

**Hugh R. Agner, 30834 Jennie La., Burlington, Wis. 53105**

**Filed Nov. 28, 1988, Ser. No. 276,696**
**Int. Cl.[5] B63H *16/04***
**U.S. Cl. 440—104** **18 Claims**



1. An oarlock comprising a pin adapted to be mounted for pivotal movement about a generally vertical axis, said pin including a generally horizontal, upwardly facing surface and an upper portion located above said surface, and

an oar supporting member mounted on said upper portion of said pin for pivotal movement relative thereto about a generally horizontal axis, said member including opposite clamping halves and means for clamping said halves around an oar, and said member having a periphery including a portion which engages said upwardly facing surface in response to pivotal movement of said member in one direction and about said horizontal axis so as to limit pivotal movement of said member in said one direction.

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**4,941,856**

**BALLOON SCULPTURING METHODS, APPARATUS AND PRODUCTS**

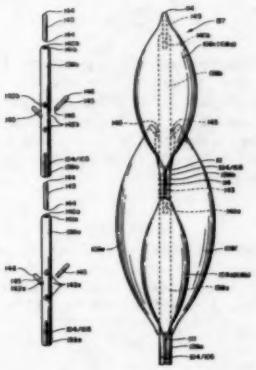
**Craig J. Lovik, 8565 Custer School Rd., Custer, Wash. 98240**

**Division of Ser. No. 183,720, Apr. 19, 1988, Pat. No. 4,850,926.**
**This application Jun. 21, 1989, Ser. No. 369,536**
**Int. Cl.[5] A63H *3/06*; F16B *7/00***
**U.S. Cl. 446—220** **4 Claims**

1. A balloon sculpture formed from a plurality of balloons of the type having a constricted neck portion terminating at one end in an inflation aperture and at the other end in an imperforate inflatable sidewall, said balloon sculpture comprising, in combination:

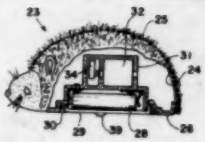
(a) a plurality of rigid, lineal, rod-like balloon formers each including:

(i) a first end;
(ii) a second end;
(iii) means defining at least one axially extending diametric slot formed in at least one (1) of said first and second former ends, said slot defining means further defining an axial bore formed in said at least one (1) of said first and second former ends; and,
(iv) means defining an axial bore in the other of said first and second former ends;
(b) at least one connector pin adapted to be inserted into, and project from, said axial bore defining means in said other of said first and second former ends, said projecting portion of said connector pin adapted to extend axially partially into said slot defining means in a second of said plurality of rod-like formers for connecting said formers in end-to-end relation;
(c) means for supporting a plurality of interconnected end-to-end rod-like formers in an upright state; and,
(d) a plurality of at least partially inflated balloons, each of said balloons having:
(i) its constricted neck portion passing through said slot defining means in one of said plurality of interconnected end-to-end rod-like formers;



(ii) at least one (1) of its inflation aperture and/or its constricted neck portion removably secured to the particular former through which its constricted neck portion passes;
(iii) its at least partially inflated sidewall stretched along, and in juxtaposition to, at least a portion of the unslotted length of at least one of said interconnected end-to-end formers; and,
(iv) a portion of said stretched, partially inflated sidewall being secured to one of said plurality of rigid, lineal, rod-like formers at a point spaced axially from the slotted end of the particular one of said formers through which that balloon's constricted neck portion passes;
whereby, said interconnected end-to-end rod-like formers define a lineal barrier precluding distension of that portion of said sidewall(s) of the particular ones of said balloons secured thereto and in juxtaposition therewith so as to cause each of said plurality of at least partially inflated balloons to assume an inflated configuration having one generally flat axial plane abutting at least one of said formers, tapered pointed extremities, and a generally ovate configuration in all other axial planes bisecting said interconnected end-to-end formers and wherein said plurality of balloons at least partially surround and conceal said formers.

**4,941,857**
**ANIMAL TOYS HAVING SWITCH AND VIBRATION MOTOR**
**Hiroaki Fujimaki, Tokyo, Japan, assignor to Tomy Kogyo Co., Inc., Tokyo, Japan**
**Continuation of Ser. No. 192,612, May 11, 1988, Pat. No. 4,867,726. This application Jul. 6, 1989, Ser. No. 375,924**
**Claims priority, application Japan, Aug. 27, 1987, 62-130857; Sep. 10, 1987, 62-138429**
**Int. Cl.[5] A63H *11/02***
**U.S. Cl. 446—353** **5 Claims**



1. An animal toy comprising:
a body shaped in the shape of an animal and having inner and outer surfaces;
means for moving the body;
an electrical motor attached to the moving means for actuating the moving means;
a control circuit electrically coupled to the electrical motor;
a pair of spaced apart contacts electrically connected tot he control circuit but isolated from each other;
the control circuit being closable to switch on the electrical motor when the pair of spaced apart electrical contacts are simultaneously touched by a human hand, wherein the body comprises an upper body shell having an open bottom, and a bottom plate receivable int he open bottom of the upper body shell, the pair of spaced apart contacts being mounted in the bottom plate.

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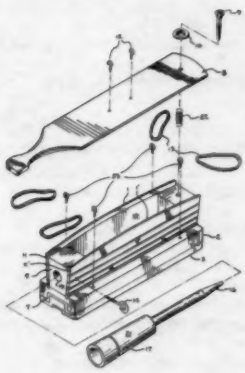
**4,941,858**
**COMBINED TURKEY CALL WITH DUAL SOUNDERS**
**Mark C. Adams, Rte. 5, Box 5216, Cleveland, Ga. 30528**
**Filed Sep. 8, 1989, Ser. No. 404,507**
**Int. Cl.[5] A63H *5/00***
**U.S. Cl. 446—397** **1 Claim**



1. A turkey call comprising two sounders in combination in one box with:
a single acoustical sound chamber having longitudinal side walls and a bottom wall, said side walls capable of transmitting vibrations and having inclined and beveled upper

edges and a convex undersurface outer edge, said sound chamber in vibration proximity to and audible communication with the sounders consisting of:

(1) an actuator arm pivotally mounted by a compression spring device on one end of the arm and additionally elastically engaged on its under surface to the top edges of the side walls as the actuator is moved horizontally producing sound in the sound chamber, and

(2) a stylus call consisting of a slate inlaid plate secured to the outside of the bottom wall of the box and a stylus assembly having, on one end, a stylus handle of a substantially cylindrically-shaped tone tube and on the other end, a stylus needle for engaging the slate plate to generate vibratory sound in the sound chamber.

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**4,941,859**

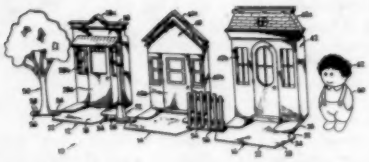
**TOWN PLAYSET**

**John V. Zaruba, Chicago, Ill., assignor to Marvin Glass & Associates, Chicago, Ill.**

**Filed Jan. 26, 1989, Ser. No. 303,610**

**Int. Cl.[5] A63H *3/52, 3/00, 33/08***

**U.S. Cl. 446—476** **5 Claims**



1. A playset comprising in combination:

a plurality of

individual toy building facades;

each building facade having a different appearance and including a simulated building front and a generally flat base;

each facade extending upwardly from its respective base;

each toy building facade base having a front edge generally parallel to the simulated building front and opposed side edges;

a number of connecting structures representing things other than toy building facades and being disposed intermediate adjacent facades;

each connecting structure including a generally flat base; and

means for connecting the base of one of the intermediate structures to the base of each of two adjacent facades adjacent their respective side edges.

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**4,941,860**

**COAXIAL TORSION DAMPER, PARTICULARLY FOR AUTOMOTIVE VEHICLES**

**Michel Graton, Paris, France, assignor to VALEO, Paris, France**

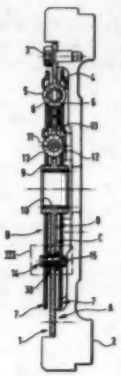
**Filed Jan. 10, 1989, Ser. No. 295,459**

**Claims priority, application France, Jan. 13, 1988, 88 00291**

**Int. Cl.[5] F16D *3/14***

**U.S. Cl. 464—68** **6 Claims**

1. A torsion damper, particularly for automotive vehicles, of the kind comprising a disc connected to a pair of guide rings (7) by means of a first spring damping device provided with a first set of springs (5) disposed partly in first openings (4) formed in the disc (1) and partly in openings (6) formed in the guide rings (7), and a damper or hub plate (8) which is connected to said guide rings by means of a second damping device provided with a second set of springs (11) disposed, on one hand, on a pitch circle having a diameter of which is smaller than that of which the first springs (5) are arranged, and on the other hand, partly in openings (12) formed in the guide ring (7), and partly in second openings (13) formed in the hub plate (8), with the damper plate being mounted coaxially with respect to said disc and located within the space defined radially by the disc (1), and said guide rings being connected to each other by means of spacers (14) each having a shank and passing through passage means (15) formed in said disc and said damper plate, wherein said passage means comprises, in respect of each of said spacers, a notch (20) formed in the inner periphery of said disc and a notch (21) formed in the outer periphery of the damper plate and wherein said notches are offset circumferentially with respect to each other and are disposed on a pitch circle the diameter of which is smaller than that of which the first springs (5) are arranged and greater than that of which the second springs (11) are arranged.



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**4,941,861**

**INTERLOCKING SHAFT COUPLING**

**Robert A. Painter, Winchester, Mass., assignor to Electronic Instrument & Specialty Corp., Stoneham, Mass.**

**Filed Dec. 28, 1987, Ser. No. 137,942**

**Int. Cl.[5] F16D *3/04***

**U.S. Cl. 464—102** **6 Claims**

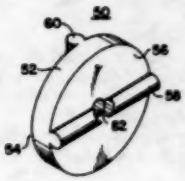
1. A three piece interlocking coupling for connecting two opposing rotary shafts, comprising:

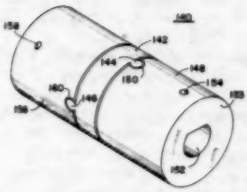
a plastic disk-shaped center member having two substantially identical salient interlocking elements protruding therefrom, one from each of its two faces, each said element having a substantially circular cross section and a longitudinal axis parallel to a diameter of said center member, each said axis oriented at right angles to the other of said axes, each said element protruding from said face far enough to be partially undercut and having a central hole bisecting said element and said longitudinal axis, said central hole having a diameter substantially the same as the diameter of said salient interlocking element for reducing the thickness of said center member where said salient interlocking elements cross to reduce warpage upon curing of the plastic;

first and second plastic cylindrical hub members, each said hub member having a recess for receiving a rotary shaft in one of its ends and a receiving recess in the other of its ends having a substantially circular cross section and a longitudinal axis parallel to a diameter of said hub member, said receiving recess shaped substantially as a complement to said interlocking elements to permit interlocking, sliding, and pivoting engagement with said center member; and

a protruding member integrally formed in the center of the receiving recess in at least one of said hub members, said protruding member having a width of less than the diame-

ter of said central hole and protruding a distance of less than the radius of said salient interlocking elements for




limiting the movement of said interlocking element in said receiving recess.

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**4,941,862**

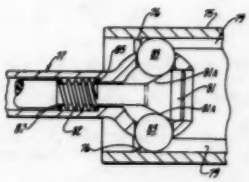
**QUICK DISCONNECT CONSTANT VELOCITY UNIVERSAL JOINT**

**Daniel W. Hazebrook, Detroit, and Steven C. Hahn, Mt. Clemens, both of Mich., assignors to GKN Automotive Inc., Auburn Hills, Mich.**

**Division of Ser. No. 945,183, Dec. 23, 1986, Pat. No. 4,753,626, which is a continuation of Ser. No. 704,196, Feb. 22, 1985, abandoned. This application Mar. 21, 1988, Ser. No. 170,944**

**Int. Cl.[5] F16D *3/221***

**U.S. Cl. 464—141** **10 Claims**



1. A quick disconnect constant velocity universal joint for transmitting a driving torque, comprising:

a hollow inner joint member having an axis of rotation, said hollow inner joint member having an outer spherical surface and a plurality of radial apertures provided through its walls along a common plane transverse to said axis of rotation;

a plurality of roller balls, one disposed in each of said radial apertures, said roller balls being free to move in said radial apertures in a radial direction from a first predetermined innermost position to a second predetermined outermost position;

an outer joint member having a cylindrical portion for receiving said outer spherical surface of said hollow inner joint member therein, the internal surface of said cylindrical portion having a plurality of rectilinear grooves provided therein, one groove for each of said plurality of roller balls; and

plunger means for operatively connecting said plurality of roller balls to said plurality of rectilinear grooves, said plunger means disposed in said hollow inner joint member for positioning said plurality of roller balls, said plunger means having a straight tapered portion near one end thereof and resilient biasing means for displacing said plurality of roller balls from said first predetermined innermost position permitting said hollow inner joint member and said outer joint member to be separated from each other to said second predetermined outermost position into said plurality of grooves to operatively connect said hollow inner joint member with said outer joint member, said plurality of roller balls being in continuous contact with said straight tapered portion at said second predetermined outermost position such that as said hollow inner joint member articulates with respect to said outer joint member, said plurality of rollers balls move along said straight tapered portion of said plunger means to maintain intimate contact with said plurality of rectilinear grooves of said outer joint member.

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**4,941,863**

**STEPLESS SPEED CHANGE MECHANISM IN BELT TRANSMISSION DEVICE**

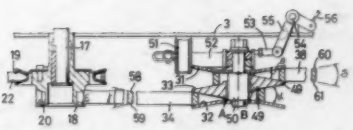
**Keiichi Sampei; Masami Kawasaki; Yoshito Dei; Katsumi Fukumoto, and Kazuo Furukawa, all of Osaka, Japan, assignors to Kubota Ltd., Osaka, Japan**

**Filed Mar. 28, 1989, Ser. No. 329,936**

**Claims priority, application Japan, Mar. 28, 1988, 63-75175; Oct. 25, 1988, 63-270386**

**Int. Cl.[5] F16H *9/16***

**U.S. Cl. 474—33** **22 Claims**




1. A stepless speed change mechanism in a belt transmission device comprising a first belt passed through a groove in a drive pulley on a drive shaft and a first groove in an intermediate pulley on an intermediate shaft, and a second belt passed through a second groove in the intermediate pulley and a groove in a driven pulley on a driven shaft, each of the two grooves in the intermediate pulley having an axial width gradually decreasing radially inwardly of the pulley, the first and second grooves being defined by a partition provided therebetween and movable on the intermediate shaft axially thereof, the pitch diameter of each of the two grooves in the intermediate pulley being variable by the axial movement of the partition, the stepless speed change mechanism being characterized in that the state of contact of the first belt with the first groove portion is varied relative to the state of contact of the second belt with the second groove portion so that when the partition on the intermediate shaft is moved axially thereof, the axial component of the pushing force exerted on the partition by one of the first and second belts differs in magnitude from the axial component of the reaction force exerted on the partition by the other belt.

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**4,941,864**

**CLUTCHABLE PULLEY SYSTEM SANS IDLER-PULLEY**

**Robert O. Bottum, Lincoln, Nebr., assignor to Exmark Manufacturing Company Incorporated, Beatrice, Nebr.**

**Filed Sep. 27, 1989, Ser. No. 413,099**

**Int. Cl.[5] F16H *7/08***

**U.S. Cl. 474—133** **6 Claims**

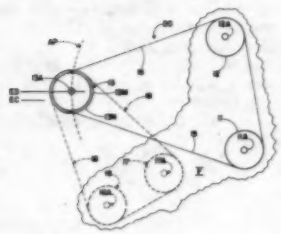
1. Clutchable pulley system mounted to a framework, said pulley system comprising:

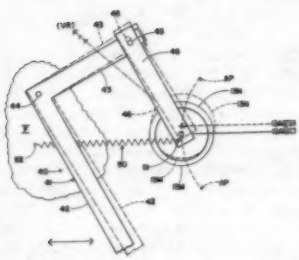
(A) a power-source pulley revolvably surrounding an axial shaft therefor that is spatially fixed at said framework;

(B) at least one primary-load pulley revolvably surrounding an axial shaft therefor that is spatially fixed at said framework, said axial shaft being substantially co-parallel to the axial shaft of said power-source pulley;

(C) a plurally-grooved transfer pulley revolvably surrounding an axial shaft therefor that is maintained in substantial co-parallelism with the axial shafts for said power-source and primary-load pulleys, said transfer pulley axial shaft lacking a spatially fixed relationship with said framework and being movable along an arcuate-path that extends concavely toward said power-source and primary-load pulleys;

(D) an annular first-belt having a first-length, said first-belt being constantly frictionally trained with said power-source pulley, said at least one primary-load pulley, and to a circumferential first-groove of said plurally-grooved transfer pulley;





(E) at least one secondary-load pulley, each revolvably surrounding an axial shaft therefor that is spatially fixed at said framework, said axial shaft being substantially co-parallel to the axial shafts for said power-source and primary-load pulleys;

(F) an annular second-belt having a second-length, said secondary-belt being substantially co-parallel with said first-belt and encircling the aggregate of: said at least one secondary-load pulley and a circumferential second-groove of said plurally-grooved transfer pulley; and

(G) transfer pulley shaft control means for controllably moving said transfer pulley shaft between at least two positions along said arcuate-path, one of said two positions being a shaft first-position wherein the secondary-belt is not frictionally engaged with the said pulleys aggregate and the second of said two positions being a shaft second-position wherein the secondary-belt is frictionally engaged with the said pulleys aggregation.

**4,941,865**

## METHOD AND APPARATUS FOR FORMING METALLIZED PACKAGING MATERIAL

**Joseph Skudrzyk, St. Louis County, Mo., assignor to Packaging Concepts, Inc., St. Louis, Mo.**

**Filed Oct. 24, 1988, Ser. No. 261,222**

**Int. Cl.[5] B05D** *3/12, 1/88;* **B31B** *1/17;* **B31F** *7/02*

**U.S. Cl. 493—22** **7 Claims**

1. A continuous method of forming a repetitive pattern on a metallized film substrate comprising the steps of:

continuously feeding a web of the metallized film substrate at a predetermined web speed;

selectively removing predetermined metallized areas from said metallized film substrate during continuous movement thereof;

said removing performed through the dry mechanical engagement and reworking of the metallized film substrate for removing said predetermined metallized areas from said web of metallized film substrate;

said mechanical engagement and reworking of the metallized film substrate performed with a rotating element having a surface which engages the surface of the continuously moving metallized film substrate; and

said removing including repetitively sensing a registered distance on the metal film substrate and selectively actuating said rotating element to remove predetermined metallized areas separated from one another by said aforementioned registered distance.

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**4,941,866**

## CENTRIFUGE

**Boris P. Gorodissky, Leninsky prospekt, 154, kv. 201; Jury A. Lotts, ulitsa Chusovskaya, 11, korpus 6, kv. 91, and Lev N. Veretenov, B.Tolmachevsky pereulok, 4, kv. 10, all of, Moscow, U.S.S.R.**

**PCT No. PCT/SU86/00120, § 371 Date Jun. 29, 1988, § 102(e) Date Jun. 29, 1988, PCT Pub. No. WO88/03840, PCT Pub. Date Jun. 2, 1988**

**PCT Filed Nov. 20, 1986, Ser. No. 241,983**

**Int. Cl.[5] B04B** *15/02*

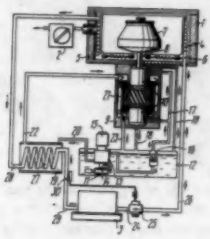
**U.S. Cl. 494—14** **2 Claims**

1. A centrifuge which comprises a replaceable rotor arranged to rotate in a rotor drive coupled vacuum chamber; a means for providing a vacuum to the vacuum chamber, to the rotor, the rotor drive having oil lubricating bearings and a cooling jacket to control a temperature of the rotor drive; an oil reservoir for the lubricating oil; a lubricating oil pump in liquid flow communication with the oil in the reservoir, and in liquid flow communication with the bearings to direct the oil from bearing oil outlet to the oil reservoir; an oil cooling heat exchange means in liquid oil flow communication with the oil pump; the oil cooling heat exchange means being in liquid oil flow communication with the cooling jacket of the rotor drive; a means in liquid oil flow communication with the cooling jacket of the rotor drive to direct the oil from the cooling jacket to the oil reservoir;

a cooling means in cooling medium fluid flow communica-

tion with a vacuum chamber cooling unit, to provide cooling for the vacuum chamber

a cooling medium outlet of the vacuum chamber cooling



unit being in cooling medium flow communication with the oil cooling heat exchange; an outlet of the oil cooling heat exchange being in cooling medium flow communication with the cooling means.

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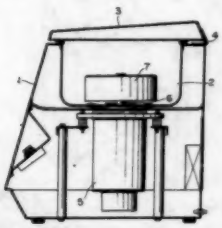
**4,941,867**

## CONTAINER ROTOR FOR A CENTRIFUGAL SEPARATOR

**Kenji Tominaga, Tokyo, Japan, assignor to Tomy Seiko Co., Ltd., Tokyo, Japan**

**Filed Aug. 4, 1989, Ser. No. 389,488**
**Int. Cl.[5] B04B *5/02***
**U.S. Cl. 494—16** **1 Claim**



1. A container rotor adapted to be mounted onto the output shaft of a driving motor for a centrifugal separator for holding a plurality of storage tubes containing specimen therein in position for centrifugal separating operation, comprising, in combination;

a rotor body means and a plurality of bucket means;

said rotor body means being of a cylindrical shape with a closed bottom and including a mount for receiving said output shaft of the driving motor in the bottom center thereof, said rotor body means having further receiving recess means for receiving operatively said plurality of bucket means in the circumference of said rotor body means disposed at an equal interval around said mount, said recess means being defined with an opposed pair of support means in the side wall sections thereof;

said plurality of bucket means being of three different types, wherein

one of said bucket means is of the type having a plurality of openings or apertures defined extending in the vertical direction when installed in operative position and at an equal interval from each other for receiving specimen containing tube means therein, and having an opposed pair of trunnion means extending outwardly from the opposite side wall portion thereof so that said bucket means may be held swingably by said support means defined in the side wall sections of said recess means;

another of said bucket means is of the type having a plurality of openings or apertures defined extending diagonally downwardly as viewed when installed in operative position of said recess means and at an equal interval from each other for receiving specimen containing tube means therein, and adapted to be received in securely held position in said recess means; and

still another of said bucket means is of the type having a plurality of openings or apertures defined extending horizontally as viewed when installed in operative position of said recess means and at an equal interval from each other for receiving specimen containing tube means therein, and adapted to be received in securely held position in said recess means.

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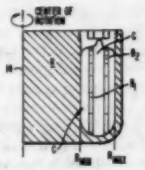
**4,941,868**

## OPTIMUM CENTRIFUGAL SEPARATION OF PARTICLES BY TRANSIENT ANALYSIS AND FEEDBACK

**Steven J. Chulay, deceased, late of Woodside, Calif. (by Viktoria D. Chulay, trustee); Allen P. Minton, Bethesda, Md., and Robert Giebeler, Cupertino, Calif., assignors to Beckman Instruments, Inc., Fullerton, Calif.**

**Filed Jul. 10, 1989, Ser. No. 379,261**
**Int. Cl.[5] B04B *13/00***
**U.S. Cl. 494—37** **7 Claims**
**MICROFICHE APPENDIX INCLUDED**
**(66 Microfiche, 3 Pages)**



1. A process for predicting the time of centrifugation and position-dependent separation of macromolecules of differing species in a gradient forming solution including a solute and solvent, the gradient forming occurring during centrifugation, said predicting process comprising the steps of;

computing the dimension of a cell relative to the spin axis of a rotor;

assuming placement in said cell of solvent, gradient forming solute and at least one species of macromolecule, said species having variable buoyancy with respect to said gradient forming solute in said solvent;

assuming rotation of said rotor to generate a centrifugal field for an increment of time;

determining for an increment of said cell at a fixed distance from the spin axis of said rotating rotor the density gradient produced by said gradient forming solute in said solvent in said centrifugal field during said increment of time;

determining from the buoyancy of said at least one specie of macromolecule a sedimentation coefficient for said macromolecule in said centrifugal field during said increment of time;

for each radial segment of said cell repeating for said increment of time said determining steps whereby the density gradient of said solute in said solvent and the separation state of said macromolecules relative to said segments are known for said increment of time;

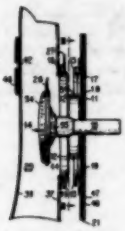
repeating for successive increments of time said determining step whereby a quantitative estimation of the time dependent position of said solute density and macromolecule in said cell is obtained as a function of time.

4,941,869

## OSTOMY PLUG-POUCH

Ben A. D'Amico, 563 Emily Dr., Lilburn, Ga. 30093

Filed Oct. 17, 1988, Ser. No. 258,872
Int. Cl.[5] A61F 5/44
U.S. Cl. 600—32 6 Claims



1. An ostomy pouch and stoma plug apparatus comprising:

(a) a support pad having a hole of sufficient size to allow the stoma to be passed therethrough, coupling rings protruding from a first side of the support pad, the smaller of the two rings being encircled by the larger, the support pad having an adhesive surface disposed on a second side thereof;

(b) a stoma plug having means for sealing the stoma and having a cap with a rim means, the smaller ring having a shoulder engageable with said rim means so that the cap can be coupled to the smaller ring to form a liquid and gas tight seal;

(c) a pouch detachably mountable on the support pad, the pouch having a grooved ring for receiving a protruding portion of the larger ring on the support pad; and

(d) a plurality of relief ports disposed between the two coupling rings, each port being spaced apart from said hole in the support pad, any fluid communication between each port and the hole being along a pathway which impedes direct fluid flow, so that any leakage from the stoma plug that penetrates beneath the adhesive surface between the stoma plug and the relief ports can exit through the ports and can be contained within the pouch.

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4,941,870

## METHOD FOR MANUFACTURING A SYNTHETIC VASCULAR PROSTHESIS

Masao Okada, Gifu; Kazuhiko Sakai, Kakamigahara; Haruo Kimura, Hashima, and Yoshito Ikada, Uji, all of Japan, assignors to Ube-Nitto Kasei Co., Ltd., Tokyo; Research Development Corporation of Japan, Tokyo and Japan Medical Supply Co., Ltd., Hiroshima, all of, Japan

Division of Ser. No. 117,696, Nov. 6, 1987, Pat. No. 4,878,907.
This application Dec. 30, 1988, Ser. No. 292,554
Claims priority, application Japan, Nov. 10, 1986, 61-265578
Int. Cl.[5] A61F 2/06
U.S. Cl. 600—36 5 Claims

1. A method for manufacturing a synthetic vascular prosthesis comprising the steps of:

dissolving an elastomer material in a solvent;

adding an inorganic salt to the solution and adjusting the viscosity of the solution;

subjecting the solution to extrusion into a hollow tube;

cutting said tube to a predetermined length to form a tubular base member;

removing the solvent from said base member and drying said base member;

removing the inorganic salt in the inner portion of said base member by dissolution with an acid to form a porous inner portion of said base member;

coating a hydrogel material inside of said base member so that said hydrogel material, forms a hydrogel layer on said base member with partial infiltrating into the pores of said porous inner portion; and

further removing the inorganic salt in the outer portion of said base member by dissolution with an acid, thereby forming a porous outer portion having a multitude of continuous pores.

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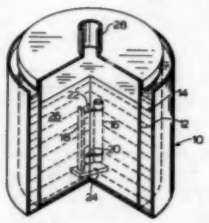
4,941,871

## PREPARATION OF SYNTHETIC MATERIALS FOR IMPLANTATION IN MAMMALIAN TISSUE

Charles A. Ward, Toronto, Canada, assignor to HSC Research Development Corporation, Toronto, Canada

Filed Aug. 25, 1988, Ser. No. 236,147
Claims priority, application Canada, Sep. 25, 1987, 547847
Int. Cl.[5] A61F 2/06, 2/04
U.S. Cl. 600—36 18 Claims



1. A method for treating a porous synthetic material which has pores extending therethrough to render said material suitable for use in bonding to living tissue, said method comprising:

enveloping said material with a liquid of sufficiently low surface tension to permit said liquid to enter pores of said material, said liquid having a sufficiently low gas content to permit said liquid to remove essentially all the gas nuclei held in said pores of said material,

heating said liquid to induce said liquid to fill essentially all pores in said material and absorb essentially of of said gas nuclei held in said pores,

replacing essentially all of said liquid in said pores of said material with a solution which is compatible with body fluid and in which proteins have a low solubility.

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4,941,872

## CONTROL HANDLE FOR SURGICAL IRRIGATION AND SUCTION DEVICE

Augustus Felix, Providence, and John Uhoch, Warwick, both of R.I., assignors to C. R. Bard, Inc., Murray Hill, N.J.

Filed Jan. 22, 1985, Ser. No. 693,277
Int. Cl.[5] A61M 1/30
U.S. Cl. 604—27 8 Claims

1. A handpiece for a surgical irrigator comprising:

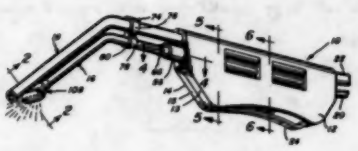
a handle body;

a flexible fluid conduit extending through the body;

connector means carried by the handpiece for connecting to the flexible conduit to a source of irrigation fluid;

means for connecting the other end of the flexible fluid conduit to a fluid outlet;

means for urging a portion of the flexible conduit transversely to form a V-shaped kink in the conduit to shut off flow through the conduit, said urging means comprising a pair of ribs mounted to the body, the ribs being spaced longitudinally along the flexible conduit, and a member engagable with the conduit at a location between the ribs, said member being constructed and arranged as to draw



the conduit transversely between the ribs into said V-shaped kinked configuration and in a manner in which the conduit is wrapped partly about the ribs;

said ribs being arranged in relative upstream and downstream positions, the more upstream of the ribs having an upper, conduit-engaging edge which is higher than the upper edge of the downstream rib, said height being measured in a direction opposite the transverse direction in which the member is arranged to draw the tube into the V-shaped kinked configuration; and

means for biasing the member in a direction which shuts off flow through the conduit.

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**4,941,873**

## CONTROLLED DIFFUSION MEDICAMENT APPLICATOR

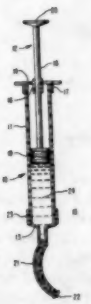
**Dan E. Fischer, Salt Lake City, Utah, assignor to Ultradent Products, Inc., Salt Lake City, Utah**

**Continuation of Ser. No. 604,029, Apr. 26, 1984, Pat. No. 4,578,055, which is a continuation of Ser. No. 60,382, Jul. 25, 1979, abandoned, which is a continuation-in-part of Ser. No. 799,168, May 23, 1977, abandoned. This application Feb. 5, 1986, Ser. No. 826,274**

**The portion of the term of this patent subsequent to Mar. 25, 2003, has been disclaimed.**

**Int. Cl.[5] A61B *10/00***

**U.S. Cl. 604—54** **7 Claims**



1. A method for controlling bleeding during dental procedures using a medicament applicator, said medicament applicator comprising a chamber containing a coagulant under pressure connected to a hollow tube having a padded orifice through which the coagulant is dispensed under hydraulic pressure, the method comprising the steps of:

applying under hydraulic pressure a coagulant to a desired area of gingival tissue using the medicament applicator so as to infuse coagulant into exposed capillaries of such tissue such that the blood within said capillaries becomes coagulated; and

simultaneously rubbing the tissue with said medicament applicator in order to remove any coagulated blood existing on the surface of the gingival tissue so as to substantially prevent reinitiation of bleeding.

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**4,941,874**

## DEVICE FOR THE ADMINISTRATION OF IMPLANTS

**Jürgen K. Sandow, Königstein/Taunus; Wilfried De Felice, Kelkheim; Horst Pajunk, and Heinrich Pajunk, both of Geisingen, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Aug. 9, 1988, Ser. No. 229,957**

**Claims priority, application Fed. Rep. of Germany, Aug. 11, 1987, 3726654; Jan. 26, 1988, 3802158**

**Int. Cl.[5] A61M *36/12***

**U.S. Cl. 604—60** **11 Claims**

1. A device for the injection of implants comprising:

an active substance container fabricated from transparent plastic, having a first end opening, a second end opening, and a cylindrical plunger channel extending between and connecting said first and second end openings, said cylindrical plunger channel including a flexible O-ring for reducing the internal diameter of said channel at a predetermined location;

a cannula extending from said first end openings;

a plunger rod movably disposed in said channel and extending from said second end opening, said rod having a concentric groove therein for receiving said O-ring;

a first protective cap for covering said cannula; and

a second protective cap for covering said plunger rod.

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**4,941,875**

## I.V. SYSTEM FOR SUCCESSIVE ADMINISTRATION OF TWO OR MORE SOLUTIONS AT DIFFERENT RATES

**John F. Brennan, 14476 Harbor Island, Detroit, Mich. 48215**

**Filed Jul. 18, 1979, Ser. No. 58,725**

**Int. Cl.[5] A61M *5/00***

**U.S. Cl. 604—81** **45 Claims**

31. In a set for the sequential administration of medical liquids to a patient, said set including:

a primary tube for the flow of a primary medical liquid therethrough and including a primary valve for controlling the flow of liquid through said primary tube,

a secondary tube for the flow of a secondary medical liquid therethrough,

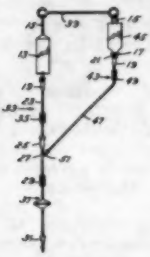
a common tube having its distal end in fluid communication with the proximal ends of said primary and secondary tube and its proximal end open for the flow of liquid therefrom to form a primary liquid flow path comprising said primary tube and said common tube and a secondary liquid flow path comprising said secondary tube and said common tube, the improvement which comprises:

a secondary flow control means in said secondary liquid flow path for adjusting the flow rate of said secondary liquid therethrough,

a primary flow control means on said primary tube for adjusting the flow rate of said primary liquid through said

primary flow path to a rate independent of the flow rate of said secondary liquid through said secondary liquid flow path, and

an air barrier means within said secondary liquid flow path substantially impervious to air but permitting liquid flow



there through while said set is in use and preventing the flow of air therethrough after said secondary liquid has been depleted, whereby, following administration of said secondary liquid, flow of said primary liquid may be resumed at the preset rate without adjustment of said primary or said secondary flow control means.

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**4,941,876**

## DEVICE FOR CONDITIONING LIQUIDS OR LIQUID AND SOLID SUBSTANCES

**Gabriel Meyer, and Ernst Howald, both of Vesenaz, Switzerland, assignors to Medicorp Holding S.A., Luxembourg**

**PCT No. PCT/EP87/00163, § 371 Date Dec. 10, 1987, § 102(e) Date Dec. 10, 1987, PCT Pub. No. WO87/06141, PCT Pub. Date Oct. 22, 1987**

**PCT Filed Mar. 23, 1987, Ser. No. 143,078**

**Claims priority, application Switzerland, Apr. 10, 1986, 01413/86**

**The portion of the term of this patent subsequent to Sep. 9, 2003, has been disclaimed.**

**Int. Cl.[5] A61M *5/28***

**U.S. Cl. 604—89** **11 Claims**

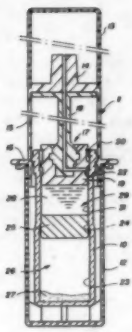
1. A storing, mixing and dispensing device comprising:

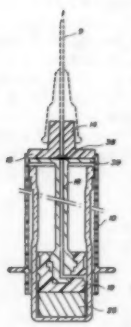
(a) a generally cylindrical elongate ampoule (10) having an open one end and a closed end with a cylindrical zone of relatively large circular cross-section (23) disposed adjacent said closed end and a cylindrical zone of relatively small circular cross-section (21) disposed between said cylindrical zone of relatively large circular cross-section and said open end;

(b) an elastic intermediary stopper (25) slidably movable inside said ampoule, said intermediary stopper, when in a storage position, being sealed in at least a portion of said cylindrical zone of relatively small circular cross-section (21) thereby dividing said ampoule into a first compartment, for containing a first substance, disposed between said closed end and said intermediary stopper and a second compartment, for containing a second substance, disposed between said intermediary stopper and said open end;

said intermediary stopper (25) being shaped to have at least one traverse dimension at least equal to the diameter of said cylindrical zone of relatively large circular cross-section, when in a distended state, and defining, when in said cylindrical zone of relatively large circular cross-section, at least one opening (30) extending past the peripheral surface of said intermediary stopper to interconnect the said first and second compartments;

(c) a piston-valve (17) comprising an axially aligned piston flange (35) and stopper means (19), said stopper means being arranged to engage said cylindrical zone of relatively small circular cross-section to seal the open end of the second compartment when in a storage position of the piston-valve (17), and conduit means, for dispensing substances from said ampoule, located within and extending through said piston-valve (17) and communicating with a peripheral surface of said piston-valve between said piston flange and stopper means, said piston flange (35) being in continuous sealing contact with the interior wall of said ampoule at all times while said stopper means (19) providing sealing contact with the interior wall of the ampoule (10) only when engaged with said cylindrical zone of relatively small circular cross-section so that when said stopper means (19) is positioned in said cylindrical zone of relatively large circular cross-section mixed substances





can flow past said stopper means into said conduit means for dispensing;

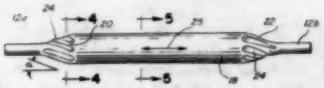
wherein when mixing and dispensing of the first and second substances is desired, said piston-valve is moved from its storage position towards said closed end to force said intermediary stopper (25) into said cylindrical zone of relatively large circular cross-section thereby allowing communication and mixing of the substances contained in the first and second compartments, further movement of said piston-valve (17) toward said closed end moves the stopper means into said cylindrical zone of relatively large circular cross-section whereby the piston flange (35) can force the mixed substances out of the ampoule past said stopper means into and through said conduit means.

**4,941,877**

## BALLOON CATHETER

**Fausto Montano, Jr., Miami Lakes, Fla., assignor to Cordis Corporation, Miami Lakes, Fla.**

**Filed Jan. 26, 1989, Ser. No. 302,302**
**Int. Cl.[5] A61M *29/02***
**U.S. Cl. 604—96** **22 Claims**



1. In a catheter having a catheter body, a portion of said body defining an inflatable and collapsible balloon, said balloon having a longitudinal axis and being of larger diameter than the adjacent portion of said body and defining transition zones at the respective balloon ends, the improvement comprising, in combination:

at least one of the transition zones being of flute shape, in which said one of the transition zones defines a plurality of radially inwardly projecting flutes about said transition zone, said flutes extending at radial angles to the balloon axis, said flutes also defining lateral angles to the balloon axis to prevent a flat-collapsed configuration of said balloon.

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**4,941,878**

## OSTOMY POUCH FLUSHER

**Albert V. Petrik, One Limekiln Pke., Glenside, Pa. 19038**

**Filed Oct. 25, 1988, Ser. No. 262,382**
**Int. Cl.[5] A61M *29/00***
**U.S. Cl. 604—105** **5 Claims**

1. An ostomy pouch flusher for emptying and cleaning an ostomy pouch installed upon a user, the ostomy pouch having a first opening surrounding a stoma of the user and a second closable drain opening distal from the first opening, the flusher comprising an elongate wand comprising a hollow tube, water inlet and discharge means adjacent to opposite ends of said wand, a handle connected to said wand adjacent to said water inlet means, said tube including a reversely bent tube extension on said inlet end defining said handle, and a frame extending along at least a portion of said wand adjacent to said discharge means, said frame extending longitudinally along and spaced from a portion of said wand to define an open space, said discharge means being positioned for the discharge of flushing water only in the direction of the open space defined by the frame whereby said wand and frame are insertable into the drain opening of an ostomy pouch and movable therein to spray the interior of said pouch, said frame and said wand maintaining the ostomy pouch in an open condition to facilitate the removal of material from the ostomy pouch through the space defined by the frame and the wand, the frame, the wand and the handle cooperating to prevent movement of the flusher to a position in which the flushing water is discharged directly toward or onto the stoma.

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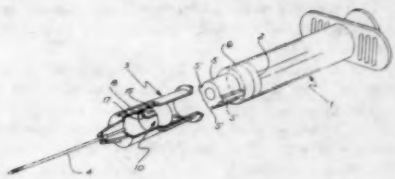
**4,941,879**

## SINGLE USE SYRINGE

**John H. A. Butler, 3 St. Mervyns Avenue, Double Bay, New South Wales 2028, and Sandy Richardson, Double Bay, both of Australia, assignors to John H. A. Butler, Double Bay, Australia**

**PCT No. PCT/AU88/00402, § 371 Date Jul. 10, 1989, § 102(e) Date Jul. 10, 1989, PCT Pub. No. WO89/03698, PCT Pub. Date May 5, 1989**
**PCT Filed Oct. 14, 1988, Ser. No. 373,291**
**Claims priority, application Australia, Oct. 14, 1987, PI4881; Mar. 29, 1988, PI7493; Jul. 29, 1988, PI9554; Sep. 13, 1988, PJ0376**
**Int. Cl.[5] A61M *5/00***
**U.S. Cl. 604—110** **7 Claims**



1. A single use syringe comprising;

an inter-acting piston and cylinder defining a variable volume chamber within which a liquid to be injected is drawn;

a needle mounting at one end of said cylinder, to receive a needle, a passage extending through said mounting enabling liquid communication between said cylinder and said needle;

a piston rod attached to said piston and operable by a user to cause movement of said piston to vary the volume of said chamber;

a valve means including a valve body located within said chamber between said mounting and said piston and dividing said chamber into a first sub-chamber located between said mounting and valve means, and a second sub-chamber located between said valve means and said piston, said valve body being movable longitudinally of said cylinder between a first position and a second position, and said valve means includes a first valve which, when said body is in said first position, permits flow from said first sub-chamber to said second sub-chamber and prevents flow from said second sub-chamber to said first sub-chamber, but when said body is in said second position, said first valve permits flow from said second sub-chamber to said first sub-chamber and prevents flow from said first sub-chamber to said second sub-chamber, and a second valve which, when said body is in said first position, permits flow from said first sub-chamber to said second sub-chamber, but prevents flow from said first sub-chamber to said second sub-chamber when said body is in said second position; and

means to prevent movement of said body from said second position to said first position.

**4,941,880**

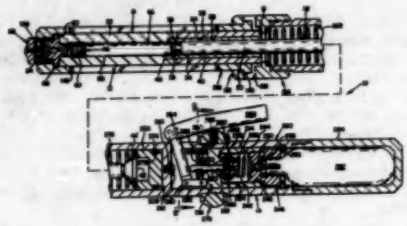
## PRE-FILLED AMPULE AND NON-INVASIVE HYPODERMIC INJECTION DEVICE ASSEMBLY

**Marvin Burns, Marina Del Rey, Calif., assignor to Bioject, Inc., Portland, Oreg.**

**Continuation-in-part of Ser. No. 64,762, Jun. 19, 1987, Pat. No. 4,790,824. This application Dec. 12, 1988, Ser. No. 284,063**

**Int. Cl.[5] A61M *37/00***

**U.S. Cl. 604—143** **15 Claims**



1. An ampule for non-invasive injecting of medication comprising:

an elongate ampule body having a plunger end and an orifice end, a medication holder-retaining area adjacent to said plunger end and a transfer area adjacent to said orifice end;

an elongate medication holder formed from a non-absorbing, non-diffusing, non-reacting material received in said medication holder-retaining area and having a free, plunger-receiving end located adjacent said body plunger end;

a plunger having one end thereof received in and closing one end of said medication holder plunger-receiving end;

a floating seal received in and closing the other end of said medication holder;

orifice means for forming a skin-piercing injection stream located at one end of said transfer area;

a bypass area located adjacent said one end of said transfer area, said bypass area being constructed and arranged to provide passage for medication from said transfer area to said orifice means with said floating seal positioned therein; and

attachment means for securing said ampule to an injection device.

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**4,941,881**

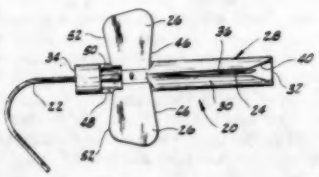
## IV INFUSION SET WITH SHEATH

**Edwin J. Masters, 142 Autumn, Sikeston, Mo. 63801, and Paul L. Ebaugh, Chateau Girardeau, 3120 Independeace, Cape Girardeau, Mo. 63701**

**Filed Aug. 23, 1989, Ser. No. 397,320**

**Int. Cl.[5] A61M *5/32***

**U.S. Cl. 604—162** **19 Claims**



1. An improved IV infusion set of the type comprising a length of tube with a hollow needle at one end, and outwardly projecting flexible wings adjacent the end of the tubing with the needle, the improvement comprising:

a sheath slidably disposed on the tube and adapted to be slid over the needle to cover the needle after use, the sheath including means for locking the sheath in its position covering the needle to prevent needlesticks from the used needle, the means for locking the sheath comprising means on the sheath for engaging the wings.

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**4,941,882**

## ADHESIVE DRESSING FOR RETAINING A CANNULA ON THE SKIN

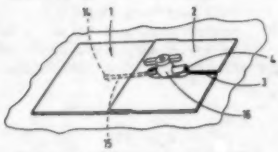
**William J. Ward, and Joanne Shorthouse, both of Hull, United Kingdom, assignors to Smith and Nephew Associated Companies, p.l.c., United Kingdom**

**Filed Mar. 8, 1988, Ser. No. 165,627**

**Claims priority, application United Kingdom, Mar. 14, 1987, 8706116**

**Int. Cl.[5] A61M *5/32***

**U.S. Cl. 604—180** **12 Claims**



1. A dressing for retaining cannulae comprising a backing film coated on one surface with an adhesive layer, the backing film comprising an adhesive coated flexible sheet attached to an adhesive coated handle, the material of the handle being different from the material of the flexible sheet, first and second release sheets covering the adhesive layer in which there is a hole and a dividing line through the dressing and the second release sheet said dividing line extending from the hole to one edge of the dressing and the second release sheet, the second release sheet contacting the adhesive surface of the handle and the hole and dividing line being located within the handle, whereby when the second release sheet is removed the hole in the dressing is adapted to be placed around a cannula.

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**4,941,883**

## DISPOSABLE SAFETY SYRINGE

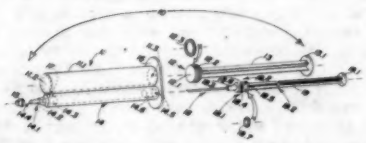
**Aldo Venturini, Via Orbetello No. 176, 1-10148 Torino, Italy**

**Filed Apr. 25, 1988, Ser. No. 186,030**

**Claims priority, application Italy, Apr. 24, 1987, 67343 A/87; Jul. 10, 1987, 67600 A/87**

**Int. Cl.[5] A61M *5/18***

**U.S. Cl. 604—186** **18 Claims**



15. A disposable safety syringe, comprising: an elongated cylindrical reservoir member, in which a plunger is housed in tight and axially sliding fashion for sucking liquids into and injecting liquids from said reservoir; an elongated tubular

sheath formed adjacent said reservoir in side to side arrangement and in fluid communication with said reservoir, each of said reservoir and sheath having a manipulation end and said sheath having a needle end; a hollow needle positioned within said sheath and a needle support member provided within said sheath for sliding movement between an active position of the needle, in which said needle protrudes from said sheath through an needle hole formed in said needle end of said sheath, and a safety position of the needle, in which said needle is withdrawn and maintained within said sheath; communication and sealing means connected to said needle support for providing communication between the hollow needle and the reservoir when said needle is in the active position and to form an air tight seal for air tight fluid communication between the hollow needle and the reservoir when said needle is in the active position, and to form an air tight seal when said needle is withdrawn in the safety position within said sheath.

**4,941,884**

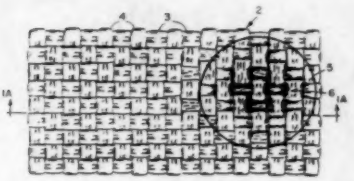
## COMFORTABLE FABRICS OF HIGH DURABILITY

**James R. Green, Hockessin, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Division of Ser. No. 343,391, Apr. 28, 1989, Pat. No. 4,900,613, which is a continuation-in-part of Ser. No. 93,490, Sep. 4, 1987, abandoned, and a continuation-in-part of Ser. No. 273,716, Nov. 7, 1988, abandoned. This application Oct. 16, 1989, Ser. No. 422,014**

**Int. Cl.[5] D06B *9/04***

**U.S. Cl. 8—120** **11 Claims**



1. A method for preparing a highly durable fabric resistant to hard surface abrasion and having good aesthetics comprising subjecting a woven fabric made from yarns of discrete organic staple fibers, said fabric having a fabric tightness greater than 1.0 and a fiber tightness of less than 1.0, said fabric containing from 30 to 92% by weight of low staple fibers having a modulus of less than 100 g/dtex with the warp yarn of said fabric containing at least 15% of organic staple fibers having a modulus greater than 200 g/dtex and at least 30% of low modulus staple fibers, to a shrinking treatment sufficient to raise the fiber tightness of the fabric to a level above 1.0.

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**4,941,885**

## HAIR REMOVING COMPOSITION AND METHOD CONTAINING THIOREDOXIN, THIOREDOXIN-DERIVED, OR THIOREDOXIN-LIKE DITHIOL PEPTIDES

**Vincent P. Piglet, Winchester, Mass., assignor to Repligen Corporation, Cambridge, Mass.**

**Continuation of Ser. No. 111,228, Oct. 22, 1987, abandoned, which is a division of Ser. No. 899,707, Aug. 25, 1986, abandoned, which is a continuation-in-part of Ser. No. 674,893, Nov. 26, 1984, abandoned. This application Sep. 14, 1989, Ser. No. 407,687**

**Int. Cl.[5] A61K *7/06, 7/55***

**U.S. Cl. 8—161** **11 Claims**

1. A composition of matter for removing human hair which comprises a thioglycolic acid compound at a concentration of about 0.01M to about 0.2M thioredoxin or a thioredoxin-derived, or thioredoxin-like, dithiol peptide at a concentration of about 1 nmole/ml to about 100 nmole/ml.

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**4,941,886**

## PROCESS FOR OBTAINING A SYNTHETIC CHAMOIS LEATHER SIMILAR TO NATURAL CHAMOIS

**Giorgio Poletto, Cirie, Italy, assignor to Lorica S.P.A., Corso Lombardia, Italy**

**Filed Jun. 16, 1988, Ser. No. 208,059**

**Claims priority, application Italy, Jun. 19, 1987, 67534 A/87**

**Int. Cl.[5] D06P *7/00***

**U.S. Cl. 8—497** **11 Claims**

1. A method for manufacturing suede-like sheet material starting from a raw material consisting of a sheet material of predetermined thickness having a resin layer and a fibrous layer, said fibrous layer comprising a porous polyurethane matrix having a fibrous reinforcement embedded therein, said reinforcement being formed by a material selected from the group consisting of non-woven fabric, polyester fibers, polyamide fibers and polyethylene fibers, and said resin layer being a covering layer of compact polyurethane resin formed securely on one face of said fibrous layer, the method comprising the steps of:

splitting said sheet material through the fibrous layer into two sheets of reduced thickness, the first sheet of which comprises said covering resin layer and a portion of said fibrous layer, and the second sheet which is formed solely of a second portion of said fibrous layer;

said splitting operation being carried out so as to cut said fibrous reinforcement and divide it between said first and second portions of the fibrous layer; and

subjecting said second sheet to a buffing operation of a type normally used on natural suede, and to a dyeing phase.

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**4,941,887**

## QUINOPHTAHALONE DERIVATIVES FOR DYEING DENIM COTTON YARN, OPTIONALLY WITH INDIGO DYES TO GIVE YELLOW, GREEN OR BLACK SHADES

**Tetsuo Sakagawa, 1-9-21, Koushien, Nishinomiya-shi, Hyougen-ken; Takayuki Nakayama, 4-20, Nishinaniwacho 5-chome, Amagasaki-shi, Hyougo-ken; Hisanobu Kunihiro, deceased, late of Nishinomiya, and by Masako Kunihiro, legal representative, 21-11, Ohyacho, Nishinomiya-shi, Hyougo-ken, all of Japan**

**Filed Jan. 22, 1988, Ser. No. 147,206**

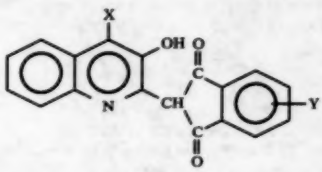
**Claims priority, application Japan, Jan. 23, 1987, 62-12594**

**Int. Cl.[5] C09B *67/22;* D06P *1/22, 3/60***

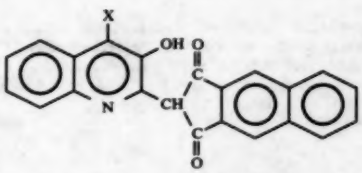
**U.S. Cl. 8—642** **3 Claims**

1. A rope-dyeing process of denim cotton yarns, which comprises repeating the following consecutive steps:

(i) immersing the yarns in the form of a rope in a dyebath which contains at least one member from the group consisting of (a) at least one quinophthalone derivative represented by the following general formula (I) or (II):



(I)



(II)

wherein X means H, Br or Cl and Y denotes H, COOR or —$COOC_2H_4OR$, wherein R is alkyl, and (b) a combination of said at least one quinophthalone derivative and an indigo dye;

(ii) squeezing the yarns; and

(iii) exposing the yarns to air to oxidize said at least one quinophthalone derivative.

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**4,941,888**

## COMMODITY STORAGE PILE PROTECTION WITH A RAINWATER HOLDING SPONGE

**Fritz Kramer, 911 W. Promontory Dr., Newport Beach, Calif. 92660**

**Filed Jan. 17, 1989, Ser. No. 297,956**

**Int. Cl.[5] C10L *9/00;* B05D *1/02***

**U.S. Cl. 44—541** **13 Claims**

2. A weather protected outdoor storage pile of a particulate

solid commodity which comprises said commodity substantially covered with a rainwater protecting thickness layer of an open celled, shrinkage controlled, water absorbing sponge blanket, said water absorbing sponge blanket comprising an aminoplast resin prepared from an aqueous solution of prepolymer resin of:

(a) urea and formaldehyde, methylolurea, dimethylolurea or methylolurea or dimethylolurea modified with,

(b) from 4 to 12% fructose by weight and, a suitable foaming agent, a catalytic amount of acid accelerator, said aqueous solutions being mixed with a gas under a pressure of from 100 to 150 pounds per square inch (p.s.i.) to form a hardenable plastic foam which dries to said sponge having a linear shrinkage factor of from 2 to 6% and water permeability of from $1.5\times10^{-5}$ to $5\times10^{-5}$ cm/sec.

3. A weather protected outdoor storage pile according to claim 2 wherein said commodity is coal.

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**4,941,889**

**BARBECUE FLAVORING BLOCKS**

**Emerson B. Holmes, 1419 N. Gardner St., Los Angeles, Calif. 90046**

**Filed May 22, 1989, Ser. No. 354,309**

**Int. Cl.[5] C10L** *5/00, 5/14*

**U.S. Cl. 44—590** **14 Claims**

9. Flavoring blocks comprising:

wood pieces;

gelatin binder holding the piece together;

water absorbed into the wood pieces; said wood pieces, gelatin, and water pasturized to destroy any bacteria or fungi present; and

a protective coating, wherein at least 50 percent of the weight of the finished wood blocks is water;

said wood pieces and gelatin molded into pieces covered with the protective coating.

12. The blocks of claim 9, including added spice.

13. The blocks of claim 9, wherein the protective coating is hard gelatin.

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**4,941,890**

**PROCESS FOR GASIFYING FUELS**

**Paul Freimann, St. Valentin, and Gernot Staudinger, Graz, both of Austria, assignors to Voest-Alpine Aktiengesellschaft, Austria**

**Division of Ser. No. 291,402, Aug. 12, 1988, which is a continuation of Ser. No. 832,988, Feb. 25, 1986, abandoned. This application Mar. 15, 1989, Ser. No. 323,883**

**Claims priority, application Austria, Mar. 8, 1985, 695/85**

**Int. Cl.[5] C10J** *3/08*

**U.S. Cl. 48—197 R** **6 Claims**

1. A method of gasifying low quality solid fuel in a gasifier which includes a primary gas chamber and a burner penetrating into said primary gas chamber, said low quality fuel being fuel whose gasification products include a high proportion of undesirable in the product gas, said method comprising the steps of

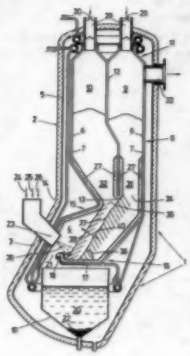
charging coke into said gasifier to form a substantially vertical coke bed having an upper free surface and a lower surface extending obliquely downwards into said primary gas chamber facing said burner,

feeding said low quality solid fuel into said primary gas chamber to form a low quality solid fuel bed superposed on said lower surface of said coke bed and having a sloping surface facing said burner,

directing at least one burner jet onto said low quality solid fuel bed, thereby gasifying said low quality solid fuel to form a crude gas,

forcing said crude gas through said coke bed, thereby removing said undesirable components from said crude gas to form a gas of high purity,

withdrawing said high purity gas from the gasifier, and



collecting and withdrawing slag formed while carrying out the above steps.

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**4,941,891**

**TOOL COMPONENT**

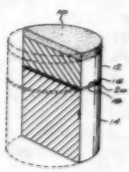
**Klaus Tank, 9 Warbleton Avenue, Essexwold, Johannesburg, Transvaal, South Africa, and Noel J. Pipkin, 138/140 Pritchard Street, Johannesburg North, Transvaal, South Africa**

**Filed Jul. 13, 1988, Ser. No. 218,644**

**Claims priority, application South Africa, Jul. 14, 1987, 87/5132**

**Int. Cl.[5] B24D** *3/00*

**U.S. Cl. 51—293** **15 Claims**



1. A method of bonding a cemented carbide surface to a metal containing surface including the steps of placing a layer of a braze alloy between the surfaces, the alloy consisting of 15–41% Mn, 67–41% Cu, 1–5% Ni and 10–17% Au, all percentages by weight, said alloy having a liquidus below 900° C., urging the surfaces together, and raising the temperature of the alloy to its working temperature thereby creating a bond between the surfaces which has a shear strength exceeding 345 MPa.

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**4,941,892**

**TOOL COMPONENT**

**Klaus Tank, 9 Warbleton Avenue, Essexwold, Bedfordview, Transvaal; Noel J. Pipkin, 138-140 Pritchard Street, Johannesburg North, Transvaal, and Nicholas Mastrantonis, 8 Field Place, Edenglen Extension 21, Edenvale, Transvaal, all of South Africa**

**Filed Jul. 13, 1988, Ser. No. 218,643**

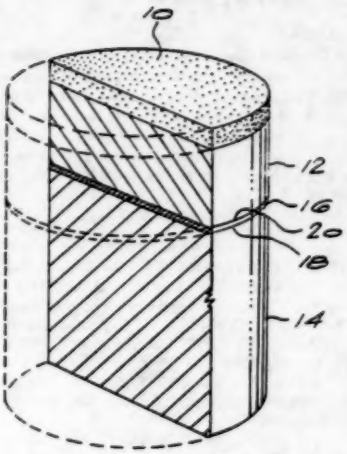
**Claims priority, application South Africa, Jul. 14, 1987, 87/5131**

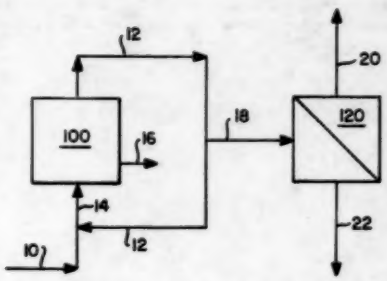
**Int. Cl.[5] B24D** *3/02*

**U.S. Cl. 51—309** **9 Claims**

1. A tool component comprising a cemented carbide body bonded to a metal containing body by a braze alloy consisting

of a liquidus below 900° C. and having the following composition, by weight:




| | |
|---|---|
| Mn | 15–41% |
| Cu | 67–41% |
| Ni | 1–5% |
| Au | 10–17% |

and at least one of In, Sn, Zn and Ag, the In and Sn, when present, being in an amount not exceeding 20% by weight and the Zn and Ag, when present, being in an amount not exceeding 30% by weight; and

the shear strength of the bond between the bodies exceeding 335 MPa.

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**4,941,893**

## GAS SEPARATION BY SEMI-PERMEABLE MEMBRANES

**Shan-Tao Hsieh, Charleston, and George E. Keller, II, South Charleston, both of W. Va., assignors to Union Carbide Chemicals and Plastics Company, Inc., Danbury, Conn.**

**Filed Sep. 19, 1989, Ser. No. 409,059**

**Int. Cl.[5] B01D** *53/22, 71/68*

**U.S. Cl. 55—16** **74 Claims**

1. A method for separating at least a first gas selected from the group consisting of $H_2$, HX and mixtures thereof contained in a gaseous mixture from at least a second gas selected from the group consisting of $SiX_aH_b$ and mixtures thereof, where X =a halogen ion,

$a = 0$ to 4,

$b = 0$ to 4,

$a + b = 4$

contained in said gaseous mixture which comprises contacting the gaseous mixture with one surface of a semi-permeable membrane which exhibits selective permeation of the at least first gas over that of the at least second gas, and removing from the vicinity of the opposite surface of the semi-permeable membrane a permeate having a concentration of the at least first gas which is greater than the concentration of the at least first gas in the gaseous mixture.

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**4,941,894**

## GAS DRYING OR FRACTIONING APPARATUS AND METHOD

**James B. Black, Elizabeth, Pa., assignor to Hankison Division of Hansen, Inc., Canonsburg, Pa.**

**Filed Apr. 12, 1988, Ser. No. 180,300**

**Int. Cl.[5] B01D** *53/04*

**U.S. Cl. 55—20** **32 Claims**

1. In an apparatus for extracting a gas from a gas mixture wherein a flow control means is selectively operable to pass a stream of such a gas mixture in a given flow direction through a gas flow path which includes a desiccant mass in a repetitive sequence of gas drying cycles to adsorb such a gas from such a gas mixture during each such gas drying cycle, and the flow control means being further operable between sequential ones of such gas drying cycles to direct a stream of gaseous medium in a reverse flow direction opposite said given flow direction through the desiccant mass to regenerate the desiccant mass by removing therefrom at least a portion of the product formed upon adsorption of such a gas by such a desiccant mass to thereby permit the desiccant mass to be effective for further gas adsorption in a subsequent gas drying cycle, a control system for limiting the duration of such a subsequent gas drying cycle comprising:

a first detector means adapted to be positioned at a selected location in such a gas flow path;

a second detector means adapted to be positioned in such a gas flow path upstream, with respect to said given flow direction, from said first detector means;

said first and second detector means being operable to gener-

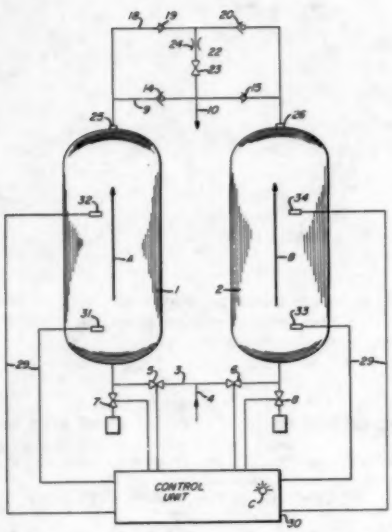
ate control signals in response to temperatures detected thereby in such a flow path;

a control means operable to process control signals generated by said first and second detector means, and means for providing operative communication between said first and second detector means, respectively, and said control means;

said control means including processor means which is operable to compute a first control parameter that is proportional to the difference between the control signal generated by said second detector means at initiation and at termination of such a regeneration cycle, and to repeatedly compute a second control parameter comprised of the difference between the control signal generated by said first detector means at initiation of such a subsequent gas drying cycle and the control signal generated thereby at intervals during said subsequent gas drying cycle;

said processor means being further operable to repeatedly compare said first and second control parameters;

said control means being further operable to actuate such flow control means to terminate said subsequent gas drying cycle when the magnitude of said second control parameter exceeds the magnitude of said first control parameter.




**4,941,895**

## PROCESS FOR THE CONTINUOUS SEPARATION OF MALEIC ANHYDRIDE FROM PROCESS GASES

**Stephen C. Ceisel; James F. Conrad, both of Shorewood; Elizabeth M. Lestan, Joliet, all of Ill., and Allen P. Nelson, Munster, Ind., assignors to Amoco Corporation, Chicago, Ill.**

**Filed Aug. 23, 1989, Ser. No. 397,392**

**Int. Cl.[5] C07D *307/60***

**U.S. Cl. 55—84** **5 Claims**

1. A process for recovery of maleic anhydride from a gaseous mixture of a reactor effluent gas stream containing maleic anhydride which comprises contacting said mixture with maleic anhydride in a gas phase wherein said maleic anhydride is injected into a gas stream effluent from an oxidation reactor, said gas stream effluent is at a temperature of from about 200° F. to about 350° F., and maleic anhydride is recovered in a condenser.

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**4,941,896**

## METHOD AND APPARATUS FOR CLEANSING GASES

**Lennart Gustavsson; Leif Lindau, and Lars-Erik Johansson, all of Väs , Sweden, assignors to Flakt AB, Nacka, Sweden**

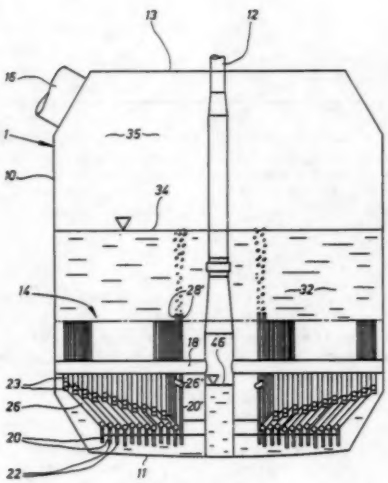
**PCT No. PCT/SE87/00421, § 371 Date Mar. 31, 1989, § 102(e) Date Mar. 31, 1989, PCT Pub. No. WO88/01902, PCT Pub. Date Mar. 24, 1988**

**PCT Filed Sep. 17, 1987, Ser. No. 340,294**

**Claims priority, application Sweden, Sep. 17, 1986, 8603914; Jul. 6, 1987, 8702770**

**Int. Cl.[5] B01D *47/00***

**U.S. Cl. 55—95** **10 Claims**



1. A method for cleansing a gas from contaminants by passing the contaminated gas through venturi devices (28) beneath the surface (34) of a bath (32) comprising a cleansing liquid,

and by causing liquid to be drawn by suction from the liquid bath into the flowing gas as a result of the decrease in pressure taking place as the speed of the gas through the venturi devices increases, comprising the steps of dividing the contaminated gas into a plurality of part flows by causing the gas to pass from a downwardly extending distribution pipe into a plurality of venturi devices, each through an inlet orifice (64) situated at a different depth beneath the surface (34), the liquid level within said distribution pipe being changed by changing inlet pressure of the contaminated gas such that at increased inlet pressure an increased number of venturi devices (28) will be operative, causing the liquid sucked into the venturi device to fully embrace the gas part flow and extract the contaminants from the flow, causing the contaminated gas, subsequent to its division into part flows, to flow substantially vertically upwards through the bath, separating the contaminant-laden liquid from the gas, and discharging the gas from above the bath.

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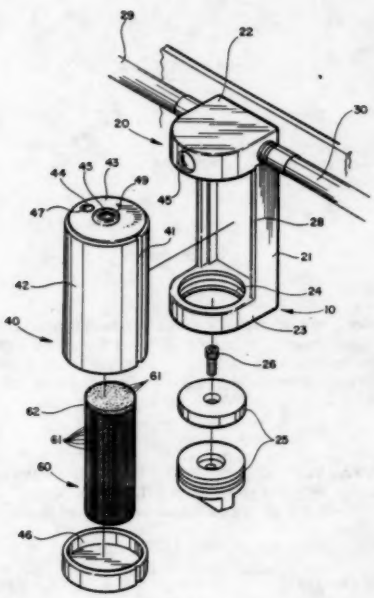
**4,941,897**

## MICROPOROUS FILTER AND METHOD

**Clifton B. Vann, III, Charlotte, N.C., assignor to L & H Technologies, Inc., Charlotte, N.C.**

**Filed Nov. 5, 1987, Ser. No. 117,667**
**Int. Cl.[5] B01D *53/22***
**U.S. Cl. 55—158** **12 Claims**




1. A filter for removing micron and sub-micron molecular-sized particulate matter from a moving gas stream, comprising:

(a) a base having a base gas inlet for being connected to a source of gas to be filtered and a base gas outlet for discharging filtered gas;

(b) an enclosed replaceable and disposable cylindrical filter module for being releasably received in and supported by said base, said filter module having a module gas inlet adapted for sealing gas flow connection to said base gas inlet, and a module gas outlet adapted for sealing gas flow connection to said base gas outlet for discharging filtered gas from the module and base; wherein one of said module gas outlet and said module gas inlet is concentrically positioned in one end of said filter module and the other of said module gas inlet and module gas outlet is eccentrically positioned in the same one end of said filter module for preventing installation of said filter module in said base in reverse gas flow direction; and

(c) a filter element sealingly positioned in said filter module in gas flow interposed relation downstream of said module gas inlet and upstream of said module gas outlet in such manner that the gas must pass through said filter element in order to reach said module gas outlet, said filter element comprising a multiplicity of hollow fibers each defined by a membrane wall formed of a microporous material surrounding a centrally-disposed lumen wherein filtration occurs by passing the gas from an upstream side of the hollow fiber through the membrane wall of the fibers to a downstream side thereof, said filter element comprising a multiplicity of hollow fibers each defined by a membrane wall formed of a microporous material surrounding a centrally-disposed lumen wherein filtration occurs by passing the gas from an upstream side of the hollow fiber through the membrane wall of the fibers to a downstream side thereof.

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**4,941,898**

## MULTICYLINDER ROTARY APPARATUS FOR DESULFURIZATION FROM EXHAUST GAS

**Takeshi Kimura, Domir Umeda No. 308, No. 11-7, Izumi 1-chome, Suginami-ku, Tokyo-to, Japan, assignor to Takeshi Kimura; Shigeru Kimura; Noriko Kimura and Junko Kimura, all of Tokyo, Japan**

**Filed May 25, 1989, Ser. No. 357,070**
**Claims priority, application Japan, May 30, 1988, 63-130182**
**Int. Cl.[5] B01D *53/18***
**U.S. Cl. 55—230** **5 Claims**

1. A gas desulfurization apparatus comprising:

(a) a cylinder casing having an axis and forming a gas inlet and a gas outlet;

(b) a plurality of rotating cylinders in said cylinder casing, each said rotating cylinder axially parallel to said cylinder casing axis and arranged to rotate about said cylinder casing axis, and having an open end adjacent said cylinder casing gas inlet and an open end adjacent said cylinder casing gas outlet;

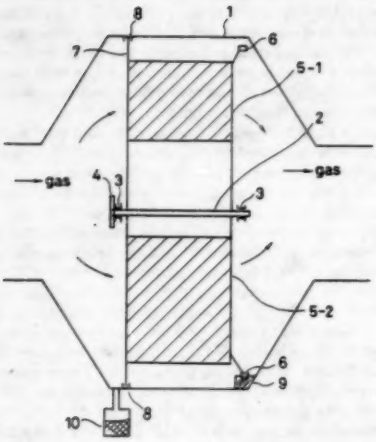
(c) a drive system means disposed in said cylinder casing attached to each of said cylinders for rotating said cylinders about said cylinder casing axes;

(d) a gas seal disc in said cylinder casing perpendicular to said cylinder casing axis and extending between said cylinder casing and said rotating cylinders for directing gas flow through said rotating cylinders;

(e) a reservoir in said cylinder casing for storing a desulfuring slurry;

(f) a waste slurry pit connected to said cylinder casing; and,

(g) a lifter attached to each said rotating cylinder to transfer a quantity of desulfuring slurry from said slurry reservoir into said associated cylinder during the rotating of said cylinders.

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**4,941,899**

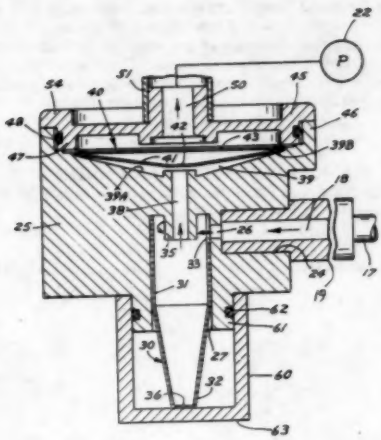
**CYCLONE PERSONAL SAMPLER FOR AEROSOLS**

**Benjamin Y. H. Liu, North Oaks, Minn., assignor to Regents of the University of Minnesota, Minneapolis, Minn.**

**Filed Apr. 24, 1989, Ser. No. 342,479**
**Int. Cl.[5] B01D *53/24*; G01N *1/24***
**U.S. Cl. 55—270** **10 Claims**

1. A personal particle sampler of size to be worn on a shirt pocket or the like for providing information relating to concentration of particles that are below a primary cutoff size comprising a housing, an inlet for atmospheric air, a vortex forming chamber in said housing for forming a vortex of air entering the housing through the inlet, said chamber including a removable section comprising a cup slidably mounted in a bore in the housing and having an enclosed wall and an end spaced from the inlet, an outlet in an end of said chamber adjacent the inlet for outlet flow from the vortex formed, the vortex action depositing particles above a secondary cutoff size in the cup, and filter means to filter the flow from the outlet to collect particles on the filter means.

8. A personal particle sampler for providing information relating to concentration of particles that are below a primary cutoff size comprising a housing of size to be worn by a person, a bore formed in the housing comprising a vortex forming chamber open at one remote end of the chamber, a vortex finder sleeve formed in the housing at an inlet end of the bore forming the chamber, an inlet opening on a side of said chamber aligned with the vortex finder sleeve to form a cyclonic action around the vortex finder sleeve as air flows from the inlet into the chamber, an outlet formed in the center of the vortex finder sleeve for outlet flow from the vortex formed, a cup removably slidably mounted in the bore and having an enclosed cylindrical wall section that forms a liner in the chamber surrounding the vortex finder sleeve, and said cup having a remote end that extends out of the bore of the housing, said inlet opening extending through a wall forming said cylindrical wall section of said cup so that the vortex is formed entirely within said cup, said cup remote end being closed to collect the particles separated by cyclonic action, the cyclonic action depositing particles above a secondary cutoff size in the cup, and means to removably retain the cup in the bore.

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**4,941,900**

**APPARATUS AND METHOD FOR GAS-LIQUID SEPARATION AND FILTRATION**

**Harry Cordes, Largo, Fla., assignor to Pall Corporation, East Hills, N.Y.**

**Filed Jul. 19, 1988, Ser. No. 221,282**
**Int. Cl.[5] B01D *29/06***
**U.S. Cl. 55—319** **7 Claims**

1. A gas-liquid separating and filtering apparatus for treating supercooled gases comprising:

(a) a housing, said housing having a separate gas inlet and gas outlet;

(b) means for providing supercooled gas to said gas inlet;

(c) means within said housing for separating substantially all liquid aerosols above about 25 microns in diameter;

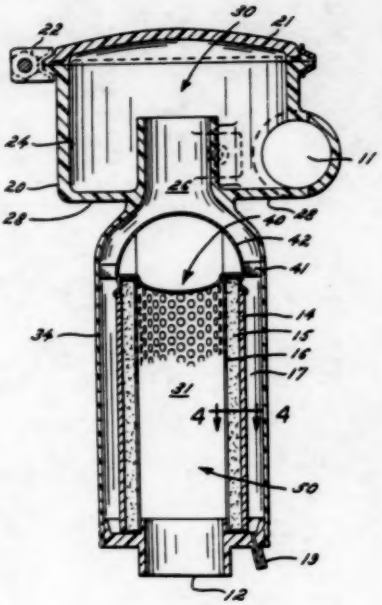
(d) means for removing the separated liquid from said housing;

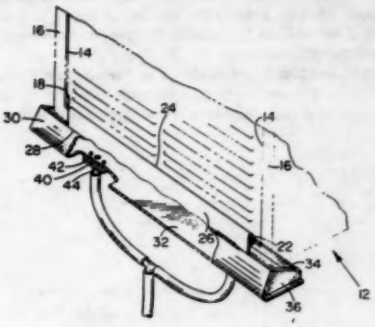
(e) an annular separating and filtering device downstream from said separating means and within said housing comprising:

(i) a coalescing medium for intercepting any remaining entrained aerosols, the coalescing medium being

adapted to effect evaporation of at least a portion of the coalesced liquid into the gas; and

means for draining said trough of condensate collected therein through an opening which directs the flow away




from the supporting structure on which the air conditioning sleeve is installed.

(ii) a particulate filter located in close proximity to and downstream from said coalescing medium.

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**4,941,901**

**RETROFIT DRAINAGE TROUGH FOR INSTALLATION ON PRE-EXISTENT CABINET CONTAINED, WALL SUPPORTED AIR CONDITIONERS**

**Rengaswamy Ramakrishnan, and Michael D. Callaway, both of San Antonio, Tex., assignors to U.S. Natural Resources, Inc., San Antonio, Tex.**

**Filed Jul. 7, 1989, Ser. No. 376,699**
**Int. Cl.[5] F25D 23/12**
**U.S. Cl. 62—262** **11 Claims**

1. A retrofit attachment for a window or wall mounted air conditioner unit wherein the air conditioner unit is constructed with a surrounding sleeve and forms condensate therein which travels over a sleeve bottom and which is provided with heat rejection means through one end and that end includes an opening formed with a lip parallel to the sleeve bottom, said lip defining the lower border of an opening, an attachment which comprises:

an elongated trough fitting under the sleeve bottom at one edge thereof to catch condensate dripping therefrom, said trough being supported by an overhead holding means for holding the trough in a fixed relationship to the sleeve bottom; and further including

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**4,941,902**

**ICE MAKER AND WATER PURIFIER**

**John D. Ruff, Alexandria, Va., assignor to Thermadyne, Inc., Alexandria, Va.**

**Division of Ser. No. 278,447, Dec. 1, 1988, Pat. No. 4,897,099.**
**This application Nov. 16, 1989, Ser. No. 437,161**
**Int. Cl.[5] C02F 1/22**
**U.S. Cl. 62—532** **9 Claims**

1. A method for providing a supply of purified ice and a supply of purified liquid water from a source of unpurified liquid water, said method comprising the steps of:

(a) cooling selected area of at least one ice-forming surface to a temperature below the freezing temperature of water by conducting thermal energy to at least one evaporator passage from said selected areas of said ice-forming surface;

(b) directing a water stream of the unpurified liquid water over said selected areas to form ice at said selected areas while washing impurities away from the formed ice with said stream;

(c) increasing the temperature at said selected areas at various times to remove said ice from said ice-forming surface;

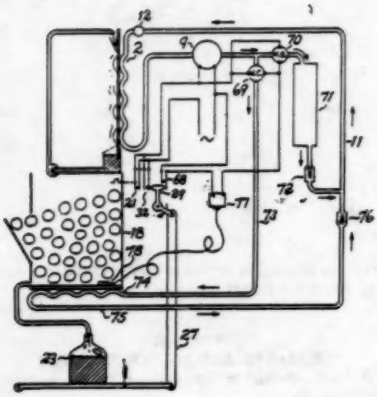
(d) collecting the ice removed in step (c) in a bin;

(e) warming a portion of said bin at selected times to melt some of the ice therein into purified liquid water;

(f) collecting in a container the purified liquid water derived in step (e);

wherein said evaporator passage is part of a continuous refrigerant flow path for refrigerant fluid, said flow path including a compressor, condenser means, a metering device and the evaporator passage, wherein step (a) includes energizing said compressor;

(g) sensing the amount of collected ice in said bin;
(h) sensing the amount of collected purified liquid water in said container;
(i) in response to both the amount of said collected ice in said bin exceeding a first predetermined amount, and the amount of said collected purified liquid water in said container exceeding a second predetermined amount, de-energizing said compressor;
(j) following step (i), re-energizing said compressor whenever either or both of the following occurs: (1) the amount of collected ice in said bin falls below the first predetermined amount; and (2) the amount of collected purified liquid water in said container falls below the second predetermined amount;
wherein said condenser means in said refrigerant flow path includes first and second condensers disposed in respective parallel and alternatively conductive first and second path sections, said second condenser being disposed at the underside of said bin to heat collected ice at the bottom of said bin;
(k) separating said second condenser from the bottom of said bin by a medium having very low heat flow characteristics;
and wherein step (e) includes the steps of:
(e.1) in response to the amount of collected purified liquid in said container being less than said second predetermined amount, actuating said second path section to cause heated refrigerant fluid to flow through said second condenser; and
(e.2) in response to the amount of collected purified liquid in said container exceeding said second predetermined amount, actuating the first path section to cause refrigerant fluid to flow through said first condenser and thereby bypass said second condenser.

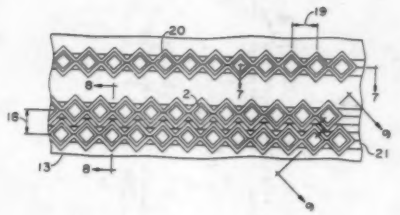


4,941,903

## NOVEL FIBER-FORMING BUSHING AND TIP PLATE

Thomas H. Jensen, Murrysville, Pa., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed May 26, 1989, Ser. No. 357,160
Int. Cl.[5] C03B 37/08
U.S. Cl. 65—1 14 Claims



1. In a bushing for the production of round glass fibers, said bushing having sidewalls, an open top, and a bottom tip plate, the improvement comprising: a plurality of integrally formed, raised ribs of a substantially solid triangular cross section crossing the width of said tip plate, the ribs further having a plurality of separate hollow tips integrally formed therein to accommodate the flow of molten glass, the ribs and tips being substantially parallel to one another, both the tips and ribs projecting downwardly from the tip plate in the direction of the flow of glass, each tip having a substantially constant wall thickness, the bottom edge of each tip being substantially parallel to the plane of the tip plate.

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4,941,904

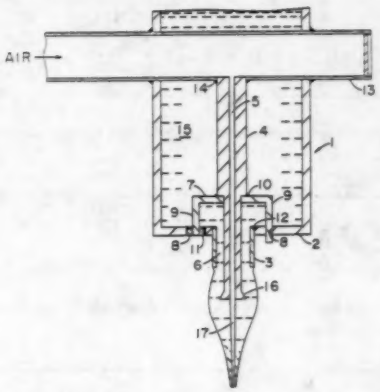
## METHOD AND APPARATUS FOR FORMING HOLLOW FIBERS

Herbert W. Barch, Natrona Heights, and William P. Marshall, Pittsburgh, both of Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.

Filed Jun. 19, 1989, Ser. No. 367,908
Int. Cl.[5] C03B 37/075
U.S. Cl. 65—1 18 Claims

1. A method for producing a plurality of hollow glass fibers, comprising the steps of: feeding molten glass through a plurality of tips, supplying a pressurized gas or gaseous mixture through a delivery tube located concentrically within each said tip, injecting said gas or gaseous mixture into said molten glass through the discharge end of each said delivery tube at a distance greater than 0.066 inches beyond the terminus of each

said tip up to a distance beyond which the formation of a hollow lumen is no longer possible inside said molten glass, attenuating, and simultaneously cooling said molten glass so as to produce a hollow glass fiber from each said tip.

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**4,941,905**

## METHODS OF SOOT OVERCLADDING AN OPTICAL PREFORM

**Pundi L. Narasimham, Norcross, Ga., assignor to American Telephone and Telegraph Company, AT&T Technologies, Inc., Berkeley Heights, N.J.**

**Continuation of Ser. No. 6,902,272, Aug. 29, 1986, abandoned. This application Mar. 4, 1988, Ser. No. 168,552**

**Int. Cl.[5] C03B *37/018, 37/012***

**U.S. Cl. 65—3.12** **16 Claims**

1. A method of providing a preform from which optical fiber is drawn, said method comprising the steps of:

providing a glassy substrate which has an axis and an outer peripheral surface and to which microwave energy is capable of being coupled;

causing the outer peripheral surface of the substrate to be substantially surrounded with a material which is optically suitable for light transmission, which is capable of being sintered and consolidated about the substrate and which when sintered is coupled to a source of microwave energy; and then

coupling a source of microwave energy to the substrate to cause each successive portion of the optically suitable material in a direction outwardly from the axis of the substrate to be sintered and consolidated and thereby become coupled to the source of microwave energy so that each next successive portion of unsintered material, which is next to be sintered, is contiguous to a sintered portion which has just been sintered and which is coupled to the source of microwave energy, to provide an optical preform from which optical fiber is capable of being drawn.

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**4,941,906**

## BALANCED MOLDING OF OPTICAL ELEMENTS

**Paul S. Schmitt, Corning, N.Y., assignor to Corning Incorporated, Corning, N.Y.**

**Continuation of Ser. No. 71,405, Jul. 9, 1987, abandoned. This application Apr. 3, 1989, Ser. No. 331,821**

**The portion of the term of this patent subsequent to Sep. 29, 2004, has been disclaimed.**

**Int. Cl.[5] C03B *29/00, 23/00***

**U.S. Cl. 65—29** **19 Claims**

1. A method of molding a glass optical element having first and second optical surfaces comprising:

providing first and second molds having molding surfaces shaped for forming said first and second optical surfaces respectively disposed in an opposing operative relationship,

providing a glass preform,

providing a mounting means for said glass preform operatively associated with said first and second molds,

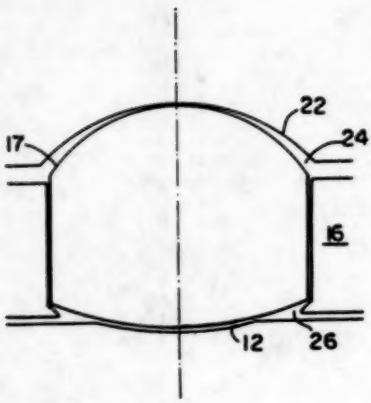
disposing said glass preform in said mounting means between said molding surfaces in a non-contacting relationship with said molding surfaces,

heating said preform and said first and second molds,

moving said first mold in a direction toward said second mold and toward said glass preform to a position such that

said molding surface of said first mold is short of a contact with said glass preform forming a gap with a void between said molding surface of said first mold and said glass preform,

moving said second mold toward said glass preform so that its molding surface contacts a portion of said glass preform with a resulting adjacent void being provided between the molding surface of said second mold and the portion of said glass preform, which faces the second mold surface but does not contact it,




thereafter moving at least one of said first and second molds toward the other mold whereby said molding surfaces of said molds contact said glass preform to shape said preform in a manner such that voids between the preform and each of said molding surfaces are filled completing formation of said first and second molded optical surfaces of said glass element, and

controlling the movement of said molding surfaces to balance the formation of said optical surfaces of said optical element so that said glass fills said voids substantially equally with respect to each other to thereby provide balanced molding of said glass optical element.

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**4,941,907**

## PROCESS FOR PRODUCING AN OPTICAL FLUOROPHOSPHATE GLASS HAVING ANOMALOUS POSITIVE PARTIAL DISPERSION

**Norbert Meinert; Werner Huber, both of Solms-Albshausen; Rainer Dreuth, Wetzlar-Niedergirmes, and Henning Franek, Braunfels-Tiefenbach, all of Fed. Rep. of Germany, assignors to Wild Leitz GmbH, Wetzlar, Fed. Rep. of Germany**

**Division of Ser. No. 268,635, Nov. 8, 1988, Pat. No. 4,859,635, which is a continuation of Ser. No. 59,925, Jun. 9, 1987, abandoned. This application Jul. 5, 1989, Ser. No. 375,494**

**Claims priority, application Fed. Rep. of Germany, Oct. 26, 1985, 3538491; Oct. 18, 1986, 3633445**

**Int. Cl.**[5] **C03C** *3/247, 4/00;* **C03B** *5/18*

**U.S. Cl. 65—66** **4 Claims**

1. Process for producing an optical fluorophosphate glass based on metaphosphates and fluorides of alkaline earth metals and of aluminum and on alkaline earth metal oxides having refractive indices $n_e$ between 1.515 and 1.546, Abbe values $\nu_e$ between 75.8 and 77.4 and positive anomalous partial dispersion values $+\Delta\nu_e$ between 14.85 and 15.15; said glass having the following composition (in weight-%):

| | |
|---|---|
| Mg | 2.4–2.7 |
| Ca | 4.5–4.9 |
| Sr | 15.9–17.6 |
| Ba | 20.2–22.3 |
| Al | 5.6–6.2 |
| P | 8.8–9.7 |
| F | 22.0–24.3 |
| O | 15.7–17.4; |

said glass being molten from a mixture which has the following composition (in weight-%):

| | |
|---|---|
| $Mg(PO_3)_2$ | 0.5–1 |
| $Ca(PO_3)_2$ | 1–2 |
| $Ba(PO_3)_2$ | 21–24 |
| $Al(PO_3)_3$ | 10–12, |

wherein the total content of all metaphosphates is between 33 and 18 weight-%;

| | |
|---|---|
| $MgF_2$ | 6–7 |
| $CaF_2$ | 8–10 |
| $SrF_2$ | 15–18 |
| $AlF_3$ | 14–16 |

wherein the total content of all fluorides is between 45 and 48 weight-%;

| | |
|---|---|
| BaO | 11–13 |
| SrO | 5–7 |

wherein the total content of all oxides is between 16 and 20 weight-%; characterized in that said process is carried out according to the following steps:

(a) heating the starting mixture at 860–900° C. within a period of 100–130 minutes,

(b) increasing the temperature within 5 minutes to 1150–1170° C.,

(c) subsequently stirring within a period of from 60 to 90 minutes,

(d) reducing the melt temperature to 930–970° C. at a reduced stirring speed, and

(e) casting at a temperature of from 750 to 760° C. in mold preheated to about 510° C.

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**4,941,908**

## PROMOTION OF FLOWERING IN FRUIT TREES

**Richard P. Pharis, Plant Physiology Research Group, Biology Dept, University of Calgary, Calgary, Alberta, Canada (T2N 1N4); Norman E. Looney, Pomology & Viticulture Section, Agriculture Canada Research Station, Summerland, B.C., Canada (V0H 1Z0), and Lewis N. Mander, Research School of Chemistry, Australia National University, P.O. Box 4, Canberra, A.C.T. 2600, Australia**

**Continuation of Ser. No. 824,875, Jan. 31, 1986, abandoned. This application Jul. 12, 1988, Ser. No. 220,382**

**Claims priority, application United Kingdom, Jan. 31, 1985, 8502424**

**Int. Cl.**[5] **A01N** *45/00*

**U.S. Cl. 71—89** **3 Claims**

1. A method of promoting flowering of an apple tree which

has demonstrated periodically inconsistent flowering, said method comprising:

applying to said apple tree, as a foliar treatment during the spring or summer preceding the year in which increased flowering is desired, not more than twelve weeks after flowering, a composition consisting essentially of a flowering-inducing effective amount of a gibberellin selected from the group consisting of gibberellin $A_1$, gibberellin $A_4$, C-3 epi-gibberellin $A_4$ and a salt or ester thereof, said gibberellin being applied in the substantial absence of gibberellins $A_3$ and $A_7$, said effective amount being in the range of from 3 to 300 micrograms of said gibberellin per spur or short shoot of said tree.

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**4,941,909**

## HETEROCYCLIC COMPOUNDS

**Jean Wenger, Uster; Paul Winternitz, Greifensee, and Martin Zeller, Dübendorf, all of Switzerland, assignors to Hoffmann-La Roche Inc., Nutley, N.J.**

**PCT No. PCT/CH88/00107, § 371 Date Feb. 14, 1989, § 102(e) Date Feb. 14, 1989, PCT Pub. No. WO88/10254, PCT Pub. Date Dec. 29, 1988**

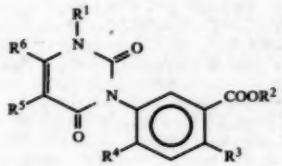
**PCT Filed Jun. 16, 1988, Ser. No. 334,952**

**Claims priority, application Switzerland, Jun. 19, 1987, 2320/87; Sep. 17, 1987, 3580/87**

**Int. Cl.[5] A01N *43/54*, *43/10*; C07D *239/54***

**U.S. Cl. 71—92** **19 Claims**

1. Compounds of the formula



I

wherein

$R^1$ signifies hydrogen, $C_{1-4}$-alkyl, $C_{3\ or\ 4}$-alkenyl, $C_{3\ or\ 4}$-alkynyl or $C_{1-4}$-haloalkyl,

$R^2$ signifies a group

or, where $R^1$ signifies haloalkyl, also hydrogen $C_{1-8}$-alkyl, $C_{2-8}$-alkenyl, $C_{2-8}$-alkynyl or $C_{2-8}$-alkoxyalkyl,

$R^3$ signifies halogen or cyano,

$R^4$ signifies hydrogen or halogen,

$R^5$ signifies hydrogen, fluorine or $C_{1-4}$-alkyl,

$R^6$ signifies $C_{1-4}$-alkyl or $C_{1-4}$-haloalkyl,

the symbols $R^7$ each independently signify hydrogen or $C_{1-3}$-alkyl and

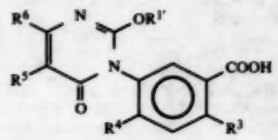
n signifies 0, 1 or 2, and

Q signifies a saturated three- to seven-membered carbocyclic or heterocyclic residue which is optionally substituted with one or more $C_{1-4}$-alkyl residues, whereby the heterocyclic residue has 1 or 2 hetero atoms selected from oxygen and sulphur and optionally a keto function in the ring,

Q signifies a phenyl residue which is optionally mono- or multiply-substituted with halogen, $C_{1-4}$-alkyl, $C_{1-4}$-haloalkyl, $C_{1-4}$-alkoxy, $C_{1-4}$-alkylthio, nitro and/or cyano and which additionally can bear a fused, saturated, carbocyclic or heterocyclic five- to seven-membered ring, whereby the heterocycle has 1 or 2 oxygen atoms in the ring,

and the corresponding enol ethers of those compounds of formula I in which $R^1$ is different from hydrogen or $C_{1-4}$-haloalkyl as well as alkali metal, alkaline earth metal, ammonium or organic base salts of those compounds of formula I in which $R^1$ or $R^2$ signifies hydrogen.

19. A weed control composition, characterized in that it contains an effective amount of at least one compound of the formula



IIIa

wherein

$R^{1'}$ signifies $C_{1-4}$-alkyl, $C_{3\ or\ 4}$-alkenyl or $C_{3\ or\ 4}$-alkynyl,

$R^3$ signifies halogen or cyano,

$R^4$ signifies hydrogenor halogen,

$R^5$ signifies hydrogen, fluorine or $C_{1-4}$-alkyl and

$R^6$ signifies $C_{1-4}$-alkyl or $C_{1-4}$-haloalkyl, or of an alkali metal, alkaline earth metal, ammonium or organic base salt thereof, as well as formulation adjuvants.

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**4,941,910**

## HERBICIDAL PYRIMIDINE DERIVATIVES

**Klaus-Helmut Müller, Duesseldorf; Joachim Kluth; Klaus-Günther Tietjen, both of Langenfeld; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

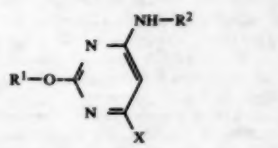
**Filed Mar. 10, 1989, Ser. No. 321,941**

**Claims priority, application Fed. Rep. of Germany, Mar. 16, 1988, 3808739**

**Int. Cl.[5] A01N *43/54*; C07D *239/47***

**U.S. Cl. 71—92** **7 Claims**

1. A pyrimidine derivative of the formula



(I)

in which

$R^1$ stands for $C_1$–$C_6$-alkyl which is optionally substituted by fluorine, chlorine, bromine, $C_1$–$C_4$-alkoxy (which is optionally substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkoxy-$C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylamino or di($C_1$–$C_4$-alkyl)-amino,

$R^2$ stands for $C_1$–$C_6$-alkyl which is optionally substituted by fluorine, chlorine, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylamino or di($C_1$–$C_4$-alkyl)-amino, for $C_3$–$C_6$-cycloalkyl or $C_3$–$C_6$-cycloalkyl-$C_1$–$C_3$-alkyl which are optionally substituted by fluorine, chlorine, bromine and/or $C_1$–$C_4$-alkyl, or for a radical selected from the group consisting of phenyl, naphthyl, phenyl-$C_1$–$C_4$alkyl, naphthyl-$C_1$–$C_4$-alkyl, pyfidyl, pyridyl-$C_1$–$C_4$-alkyl, quinolinyl, quinolinyl-$C_1$–$C_4$-alkyl, isoquinolinyl, isoquinolinyl-$C_1$–$C_4$-alkyl, pyrimidinyl, pyrimidinyl-$C_1$–$C_4$-alkyl, furyl, furylmethyl, thienyl, thienylmethyl, pyrrolyl, pyrrolyl-$C_1$–$C_4$-alkyl, pyrazolyl, pyrazolyl-$C_1$–$C_4$-alkyl, imidazolyl and imidazolyl-$C_1$–$C_4$-alkyl which is optionally substituted by fluorine, chlorine bromine, iodine, cyano, nitro, $C_1$–$C_4$-alkyl (which is optionally substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkoxy or $C_1$–$C_2$-alkylenedioxy (which are optionally substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl (which are optionally substituted by fluo-

rine and/or chlorine), di-($C_1$–$C_2$-alkyl)-amino and/or by $C_1$–$C_4$-alkoxy-carbonyl, and stands for fluorine, chlorine, bromine, amino, cyanoamino or for a radical from the group consisting of $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylamino and di-($C_1$–$C_4$-alkyl)-amino which is optionally substituted by fluorine, chlorine, bromine, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylamino or di-($C_1$–$C_4$-alkyl)-amino.

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**4,941,911**

## 2-PHENYLPYRIDAZIN-3-ONE COMPOUNDS, THEIR PREPARATION AND THEIR USE AS HERBICIDES

**Wolfgang Freund, Neustadt; Gerhard Hamprecht, Weinheim; Bruno Wuerzer, Otterstadt; Karl-Otto Westphalen, Speyer, and Norbert Meyer, Ladenburg, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

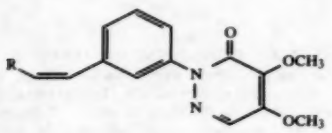
**Filed Mar. 9, 1989, Ser. No. 321,064**

**Int. Cl.**[5] **A01N** *43/58;* **C07D** *237/14*

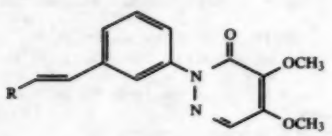
**U.S. Cl. 71—92** **9 Claims**

1. 2-Phenylpyridazin-3-one compounds of the formulae

Ia



Ib



where R is $C_1$–$C_8$-alkyl; benzyl, where the aromatic ring may carry 1 to 3 of the substituents fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-haloalkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-haloalkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-haloalkylthio or cyano; $C_3$–$C_8$-cycloalkyl which may carry 1 to 3 of the substituents $C_1$–$C_4$-alkyl, $C_1$–$C_4$-haloalkyl, $C_1$–$C_4$-alkoxy or $C_1$–$C_4$-haloalkoxy; styryl, where the aromatic ring may carry 1 to 3 of the substituents nitro, fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-haloalkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-haloalkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-haloalkylthio or cyano; a 6-membered aromatic ring which may be benzo-fused and may carry 1 to 4 of the substituents $C_1$–$C_6$-alkyl, $C_1$–$C_6$-haloalkyl, $C_1$–$C_6$-alkoxy, $C_1$–$C_6$-haloalkoxy, $C_1$–$C_6$-alkylthio, $C_1$–$C_6$-haloalkylthio, fluorine, chlorine, bromine, nitro, cyano, amino, di-$C_1$–$C_4$-alkylamino, $C_2$–$C_6$-acylamino, $C_1$–$C_4$-alkoxycarbonyl, phenoxy or phenylthio.

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**4,941,912**

## HERBICIDAL SUBSTITUTED SULPHONYLAMINOAZOLES

**Rolf Kirsten, Monheim; Joachim Kluth, Langenfeld; Christa Fest, Wuppertal; Ernst Gesing, Erkrath-Hochdahl; Klaus-Helmut Müller, Duesseldorf; Hans-Jochem Riebel; Peter Babczinski, both of Wuppertal; Otto Schallner, Monheim; Hans-Joachim Santel, Leverkusen; Robert R. Schmidt, Bergisch Gladbach, and Harry Strang, Duesseldorf, all of Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Feb. 28, 1989, Ser. No. 317,219**

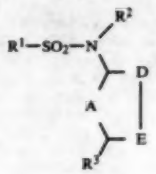
**Claims priority, application Fed. Rep. of Germany, Mar. 4, 1988, 3807034; Jul. 29, 1988, 3825867**

**Int. Cl.**[5] **C07D** *403/04;* **A01N** *43/653*

**U.S. Cl. 71—92** **15 Claims**

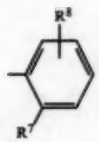
1. A substituted sulphonylaminoazole of the formula

(I)



in which

$R^1$ stands for the radical



wherein

$R^7$ and $R^8$ are identical or different and stand for hydrogen, fluorine, chlorine, bromine, iodine, cyano, nitro, $C_1$–$C_6$-alkyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, $C_1$–$C_4$-alkoxycarbonyl, $C_1$–$C_4$-alkylamino-carbonyl, di-($C_1$–$C_4$-alkyl)aminocarbonyl, hydroxyl, $C_1$–$C_4$-alkoxy, formyloxy, $C_1$–$C_4$-alkylcarbonyloxy, $C_1$–$C_4$-alkoxycarbonyloxy, $C_1$–$C_4$-alkylamino-carbonyloxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl, $C_1$–$C_4$-alkylsulphonyl, di-($C_1$–$C_4$-alkyl)-aminosulphonyl, $C_3$–$C_6$-cycloalkyl or phenyl), for $C_2$–$C_6$-alkenyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, $C_1$–$C_4$-alkoxy-carbonyl, carboxyl or phenyl), for $C_2$–$C_6$-alkinyl (which is optionally substituted by fluorine, chlorine, bromine, cyano, $C_1$–$C_4$-alkoxycarbonyl, carboxyl or phenyl), for $C_1$–$C_4$-alkoxy (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, $C_1$–$C_4$-alkoxycarbonyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl), for $C_1$–$C_4$-alkylthio (which is optionally substituted by fluorine, chlorine, bromine, cyano, carboxyl, $C_1$–$C_4$-alkoxy-carbonyl, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl), for $C_3$–$C_6$-alkenyloxy (which is optionally substituted by fluorine, chlorine, bromine, cyano or $C_1$–$C_4$-alkoxycarbonyl), for $C_2$–$C_6$-alkenylthio (which is optionally substituted by fluorine, chlorine, bromine, cyano, nitro, $C_1$–$C_3$-alkylthio or $C_1$–$C_4$-alkoxycarbonyl), $C_3$–$C_6$-alkinyloxy, $C_3$–$C_6$-alkinylthio or for the radical —$S(O)_p$—$R^9$, p standing for the numbers 1 or 2 and

$R^9$ standing for $C_1$–$C_4$-alkyl (which is optionally substituted by fluorine, chlorine, bromine, cyano or $C_1$–$C_4$-alkoxy-carbonyl), $C_3$–$C_6$-alkenyl, $C_3$–$C_6$-alkinyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkoxy-$C_1$–$C_4$-alkylamino, $C_1$–$C_4$-alkylamino, di-($C_1$–$C_4$-alkyl)-amino or for the radical —$NHOR^{10}$,

$R^{10}$ standing for $C_1$–$C_6$-alkyl (which is optionally substituted by fluorine, chlorine, cyano, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl, $C_1$–$C_4$-alkylsulphonyl, $C_1$–$C_4$-alkyl-carbonyl, $C_1$–$C_4$-alkoxy-carbonyl, $C_1$–$C_4$-alkylamino-carbonyl or di-($C_1$–$C_4$-alkyl)-aminocarbonyl), for $C_3$–$C_6$-alkenyl (which is optionally substituted by fluorine, chlorine or bromine), $C_3$–$C_6$-alkinyl, $C_3$–$C_6$-cycloalkyl, $C_3$–$C_6$-cycloalkyl-$C_1$–$C_2$-alkyl, phenyl-$C_1$–$C_2$-alkyl (which is optionally substituted by fluorine, chlorine, nitro, cyano, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy or $C_1$–$C_4$-alkoxy-carbonyl), for benzhydryl or for phenyl (which is optionally substituted by fluorine, chlorine, nitro, cyano, $C_1$–$C_4$-alkyl, trifluoromethyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_2$-fluoroalkoxy, $C_1$–$C_4$-alkylthio, trifluoromethylthio or $C_1$–$C_4$-alkoxy-carbonyl),

$R^7$ and $R^8$ furthermore stand for phenyl or phenoxy, for $C_1$–$C_4$-alkylcarbonylamino, $C_1$–$C_4$-alkoxycarbonylamino, $C_1$–$C_4$-alkylamino-carbonylamino, di-($C_1$–$C_4$-alkyl)-amino-carbonylamino, or for the radical —CO—$R^{11}$,

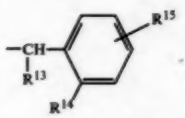
$R^{11}$ standing for $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy, $C_3$–$C_6$-cycloalkoxy, $C_3$–$C_6$-alkenyloxy, $C_1$–$C_4$-alkylthio, amino, $C_1$–$C_4$-alkylamino, $C_1$–$C_4$-alkoxyamino, $C_1$–$C_4$-alkoxy-$C_1$–$C_4$-alkyl-amino or di-($C_1$–$C_4$-alkyl)-amino (which are optionally substituted by fluorine and/or chlorine),

$R^7$ and $R^8$ furthermore stand for $C_1$–$C_4$-alkylsulphonyloxy, di-($C_1$–$C_4$-alkyl)-aminosulphonylamino or for the radical —CH=N—$R^{12}$,

$R^{12}$ standing for $C_1$–$C_6$-alkyl which is optionally substituted by fluorine, chlorine, cyano, carboxyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl, for benzyl which is optionally substituted by fluorine or chlorine, for $C_3$–$C_6$-alkenyl or $C_3$–$C_6$-alkinyl, each of which is optionally substituted by fluorine or chlorine, for phenyl which is optionally substituted by fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, trifluoromethyl, trifluoromethoxy or trifluoromethylthio, for $C_1$–$C_6$-alkoxy, $C_3$–$C_6$-alkenoxy, $C_3$–$C_6$-alkinoxy or benzyloxy, each of which is optionally substituted by fluorine and/or chlorine, for amino, $C_1$–$C_4$-alkylamino, di-($C_1$–$C_4$-alkyl)-amino, phenylamino, $C_1$–$C_4$-alkyl-carbonyl-amino, $C_1$–$C_4$-alkoxy-carbonylamino, $C_1$–$C_4$-alkylsulphonylamino or for phenylsulphonylamino which is optionally substituted by fluorine, chlorine, bromine or methyl,

wherein furthermore

$R^1$ stands for the radical



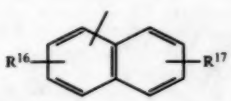
wherein

$R^{13}$ stands for hydrogen or $C_1$–$C_4$-alkyl,

$R^{14}$ and $R^{15}$ are identical or different and stand for hydrogen, fluorine, chlorine, bromine, nitro, cyano, $C_1$–$C_4$-alkyl (which is optionally substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkoxy (which is optionally substituted by fluorine and/or chlorine), carboxyl, $C_1$–$C_4$-alkoxy-carbonyl, $C_1$–$C_4$-alkylsulphonyl or di-($C_1$–$C_4$-alkyl)aminosulphonyl;

wherein furthermore

$R^1$ stands for the radical

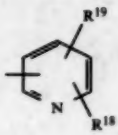


wherein

$R^{16}$ and $R^{17}$ are identical or different and stand for hydrogen, fluorine, chlorine, bromine, nitro, cyano, $C_1$–$C_4$-alkyl (which is optionally substituted by fluorine and/or chlorine) or $C_1$–$C_4$-alkoxy (which is optionally substituted by fluorine and/or chlorine);

wherein furthermore

$R^1$ stands for the radical

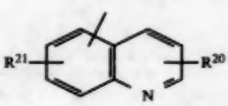


wherein

$R^{18}$ and $R^{19}$ are identical or different and stand for hydrogen, fluorine, chlorine, bromine, nitro, cyano, $C_1$–$C_4$-alkyl (which is optionally substituted by fluorine and/or chlorine), $C_2$–$C_4$-alkenyl (which is optionally substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkoxy (which is optionally substituted by fluorine and/or chlorine), for $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl (which are optionally substituted by fluorine and/or chlorine), and for di-($C_1$–$C_4$-alkyl)aminosulphonyl, $C_1$–$C_4$-alkoxy-carbonyl, dimethylaminocarbonyl or dioxolanyl;

wherein furthermore

$R^1$ stands for the radical



wherein

$R^{20}$ and $R^{21}$ are identical or different and stand for hydrogen, fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl (which is optionally substituted by fluorine and/or bromine), $C_1$–$C_4$-alkoxy (which is optionally substituted by fluorine and/or chlorine), for $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl (which are optionally substituted by fluorine and/or chlorine), or for di-($C_1$–$C_4$-alkyl)-aminosulphonyl;

wherein furthermore

$R^1$ stands for the radical

wherein

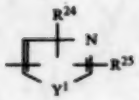
$R^{22}$ and $R^{23}$ are identical or different and stand for hydrogen, fluorine, chlorine, bromine, cyano, nitro, $C_1$–$C_4$-alkyl (which is optionally substituted by fluorine, chlorine, $C_1$–$C_4$-alkoxy and/or $C_1$–$C_4$-halogenoalkoxy), $C_1$–$C_4$-alkoxy (which is optionally substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylsulphinyl or $C_1$–$C_4$-alkylsulphonyl (which is optionally substituted by fluorine and/or chlorine), di-($C_1$–$C_4$-alkyl)-amino-sulphonyl or $C_1$–$C_4$-alkoxycarbonyl, and

$A^1$ stands for oxygen, sulphur or the grouping N-$Z^1$,

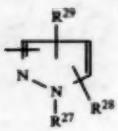
$Z^1$ standing for hydrogen, $C_1$–$C_4$-alkyl (which is optionally substituted by fluorine, chlorine, bromine or cyano), $C_3$–$C_6$-cycloalkyl, benzyl, phenyl (which is optionally substituted by fluorine, chlorine, bromine or nitro), $C_1$–$C_4$-alkylcarbonyl, $C_1$–$C_4$-alkoxy-carbonyl or di-($C_1$–$C_4$-alkyl)-aminocarbonyl;

wherein furthermore

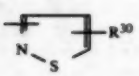
$R^1$ stands for the radical



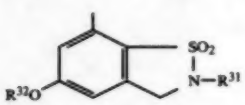
wherein
$R^{24}$ and $R^{25}$ are identical or different and stand for hydrogen, $C_1$–$C_4$-alkyl, halogen, $C_1$–$C_4$-alkoxycarbonyl, $C_1$–$C_4$-alkoxy or $C_1$–$C_4$-halogenoalkoxy,
$Y^1$ stands for sulphur or the grouping N-$R^{26}$,
$R^{26}$ standing for hydrogen or $C_1$–$C_4$-alkyl;
wherein furthermore
$R^1$ stands for the radical



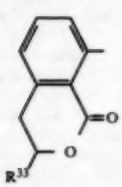
wherein
$R^{27}$ stands for hydrogen, $C_1$–$C_4$-alkyl, phenyl or (iso)-quinolinyl,
$R^{28}$ stands for hydrogen, halogen, cyano, nitro, $C_1$–$C_4$-alkyl (which is optionally substituted by fluorine and/or chlorine), $C_1$–$C_4$-alkoxy (which is optionally substituted by fluorine and/or chlorine), dioxolanyl or $C_1$–$C_4$-alkoxy-carbonyl and $R^{29}$ stands for hydrogen, halogen or $C_1$–$C_4$-alkyl;
wherein furthermore
$R^1$ stands for the radical



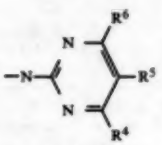
wherein
$R^{30}$ stands for hydrogen, halogen, $C_1$–$C_4$-alkyl or $C_1$–$C_4$-alkoxy-carbonyl;
wherein furthermore
$R^1$ stands for the radical



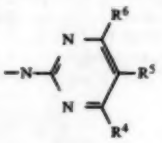
wherein
$R^{31}$ stands for $C_1$–$C_4$-alkyl and
$R^{32}$ stands for $C_1$–$C_4$-alkyl,
wherein furthermore
$R^1$ stands for the radical



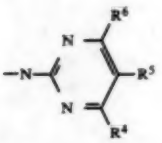
wherein
$R^{33}$ stands for hydrogen or methyl;
in which furthermore
$R^2$ stands for hydrogen or for the grouping $-SO_2-R^1$,
in which furthermore
$R^3$ stands for hydrogen, fluorine, chlorine, bromine, iodine, hydroxyl, mercapto, amino or for a radical from the group consisting of $C_1$–$C_4$-alkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkylamino and di-($C_1$–$C_4$-alkyl)amino, which radical is optionally substituted by fluorine and/or chlorine,
A stands for nitrogen, a CH grouping or the grouping



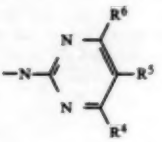
D stands for nitrogen or the grouping



E stands for nitrogen or the grouping



provided one of the radicals A, D or E is



wherein
$R^4$ stands for hydrogen, fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-halogenoalkyl, $C_1$–$C_2$-alkoxy-$C_1$–$C_2$-alkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-halogenoalkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-halogenoalkylthio, amino, $C_1$–$C_4$-alkylamino, dimethylamino or diethylamino,
$R^5$ stands for hydrogen, fluorine, chlorine, bromine, cyano, methyl, formyl, acetyl, methoxycarbonyl or ethoxycarbonyl and
$R^6$ stands for hydrogen, fluorine, chlorine, bromine, $C_1$–$C_4$-alkyl, $C_1$–$C_4$-halogenoalkyl, $C_1$–$C_4$-alkoxy, $C_1$–$C_4$-halogenoalkoxy, $C_1$–$C_4$-alkylthio, $C_1$–$C_4$-alkyl-amino, dimethylamino or diethylamino.

12. A herbicidal composition comprising a herbicidally effective amount of a compound or salt thereof according to claim 1 and diluent.

**4,941,913**

## PROCESS FOR HEATING STEEL MELTS AS WELL AS DEVICE FOR PERFORMING THIS PROCESS

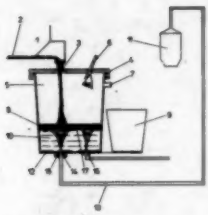
**Lucian Pochmarski, Roseggerstrasse, and Otto Köller, Kerpelystrasse, both of Austria, assignors to Voest-Alpine Stahl Donawitz Gesellschaft M.B.H., Leoben-Donawitz, Austria**

**Filed Jul. 10, 1989, Ser. No. 377,095**

**Claims priority, application Austria, Jul. 22, 1988, 1882/88**

**Int. Cl.[5] C21C *7/06***

**U.S. Cl. 75—537** **12 Claims**



1. Process for heating steel melts comprising:

heating within a ladle steel melts covered with a slag rich in iron oxides; and

exothermically reacting a metal with the oxygen of said melt and the oxygen of said slag by injecting into the mixture of steel melt and slag, via nozzles in the bottom of said ladle, said exothermically-reacting metal with an inert gas during filling of said ladle.

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**4,941,914**

## DESULFURIZATION AGENT

**Donald B. Craig, Grand Island, and Thomas K. McCluhan, Tonawanda, both of N.Y., assignors to Elkem Metals Company, Pittsburgh, Pa.**

**Filed May 18, 1989, Ser. No. 353,700**

**Int. Cl.[5] C21C *7/02***

**U.S. Cl. 75—309** **12 Claims**

1. A method for making a desulfurization agent for molten iron comprising the steps of forming a molten composition of a calcium oxide; a calcium fluoride; and an aluminum oxide; rapidly cooling said molten composition to a solid composition; and combining said solid composition with a commercial calcium carbide to form a desulfurizing agent.

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**4,941,915**

## THIN FILM FORMING APPARATUS AND ION SOURCE UTILIZING PLASMA SPUTTERING

**Morito Matsuoka, Katsuta, and Ken'ichi Ono, Mito, both of Japan, assignors to Nippon Telegraph and Telephone Corporation, Tokyo, Japan**

**Filed Feb. 7, 1989, Ser. No. 307,342**

**Claims priority, application Japan, Feb. 8, 1988, 63-25603; Feb. 8, 1988, 63-25604; Aug. 12, 1988, 63-200113**

**Int. Cl.[5] C23C *14/35*; H01J *27/02***

**U.S. Cl. 204—298.12** **19 Claims**

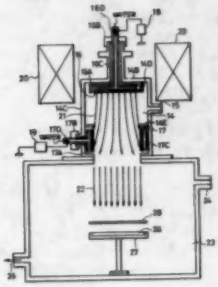
1. A thin film forming apparatus comprising:

a plasma generating chamber into which a gas is introduced to generate plasma;

a first target and a second target made of materials to be sputtered and disposed at both end portions of an interior of said plasma generating chamber, respectively, one of said first and second targets having the form of a tube and the other of said targets having the form of a plate;

at least one power supply for applying a negative potential to said first and second targets;

magnetic means for establishing a magnetic field within said plasma generating chamber and inducing magnetic flux leaving one of said first and second targets and entering the other target; and



a specimen chamber communicated with said plasma generating chamber on the side of said tubular target and incorporating therein a substrate holder.

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**4,941,916**

## PROCESS AND APPARATUS FOR SUPPLYING A KROLL REACTOR WITH ZIRCONIUM TETRACHLORIDE VAPOUR

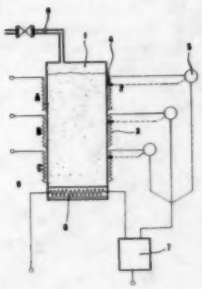
**Jean Boutin, St Martin D'Heres; Pierre Brun, Grenoble, and Airy-Pierre Lamaze, Jarrie, all of France, assignors to Compagnie Europeenne Du Zirconium Cezus, Courbevoie, France**

**Filed Mar. 21, 1988, Ser. No. 171,267**

**Claims priority, application France, Mar. 31, 1987, 87 4776**

**Int. Cl.[5] C22B *7/00***

**U.S. Cl. 75—10.12** **6 Claims**



1. In a process for supply of a Kroll reactor with zirconium tetrachloride vapor by vaporization of zirconium tetrachloride powder in a sublimator utilizing heating power, and passing the vapor obtained into the reactor, the improvement comprising supplying a major portion of the total heating power to the power internally of the sublimator for sublimation of the zirconium tetrachloride powder, and supplying the remainder of the heating power externally of the sublimator to a wall of said sublimator in order to compensate heat losses of the wall.

4,941,917

## PROCESS FOR RECOVERY OF PRECIOUS METALS FROM CARRONACEOUS ORES USING CHLORINE DIOXIDE

Lawrence M. Cenegy, Spring, Tex.; Samuel G. Deal, Salt Lake City; Max E. Cooley, Tooele, both of Utah, and Paul B. Clark, Evanston, Wyo., assignors to Exxon Chemical Patents Inc., Linden, N.J. and Barrick (USA) Inc., a part interest

Filed May 30, 1989, Ser. No. 358,957

Int. Cl.[5] C22B *11/04*

U.S. Cl. 75—744 17 Claims

1. A method of treating a carbonaceous ore containing precious metals to destroy or oxidize carbon, said method comprising

(a) forming an aqueous slurry of said ore;

(b) adjusting the pH of said slurry to below about 6; and

(c) treating the slurry with an effective amount of an aqueous solution of chlorine dioxide to destroy or react with at least 50 wt % of organic carbon in the ore.

4,941,918

## SINTERED MAGNESIUM-BASED COMPOSITE MATERIAL AND PROCESS FOR PREPARING SAME

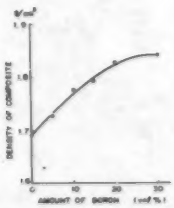
Eiji Horikoshi, Atsugi; Tsutomu Iikawa, Kawasaki, and Takehiko Sato, Yokohama, all of Japan, assignors to Fujitsu Limited, Kawasaki, Japan

Filed Dec. 12, 1988, Ser. No. 282,506

Claims priority, application Japan, Dec. 12, 1987, 62-313142; Apr. 12, 1988, 63-089489; Apr. 13, 1988, 63-090927

Int. Cl.[5] B22F *1/00*

U.S. Cl. 75—229 20 Claims




1. A sintered magnesium-based composite material comprising a magnesium or magnesium-based alloy matrix and a boron containing reinforcement additive dispersed in the matrix, said additive comprising boron particles or boron-coated particles of boron carbide, silicon nitride, silicon carbide, aluminum oxide or magnesium oxide.

4,941,919

## COPPER-BASED SLIDING MATERIAL AND METHOD FOR PRODUCING THE SAME

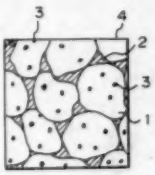
Eiji Asada; Takashi Tomikawa, and Tatsuhiko Fukuoka, all of Toyota, Japan, assignors to Taiho Kogyo Co., Ltd., Toyota, Japan

Filed Jun. 15, 1988, Ser. No. 206,789

Claims priority, application Japan, Jun. 17, 1987, 62-149270

Int. Cl.[5] C22C *29/12*

U.S. Cl. 75—235 34 Claims




1. A sintered sliding material consisting of from 1 to 10% by weight of graphite, from 0.1 to 7% by weight of alumina, and balance of copper as a matrix, characterized in that the alumina is dispersed in the copper matrix.

4,941,920

## SINTERED TARGET MEMBER AND METHOD OF PRODUCING SAME

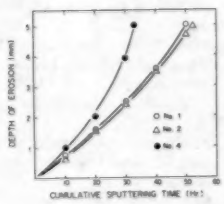
Tsutomu Inui, Yonago; Shun-ichiro Matsumoto, Yasugi; Rokuo Ichiyasu, Yonago, and Takeo Mizuguchi, Yasugi, all of Japan, assignors to Hitachi Metals, Ltd., Tokyo, Japan

Filed Nov. 23, 1988, Ser. No. 274,561

Claims priority, application Japan, Nov. 25, 1987, 62-297256; Jun. 16, 1988, 63-148728

Int. Cl.[5] B22F *1/00*

U.S. Cl. 75—246 11 Claims




1. A sintered target member consisting essentially of 50–75 weight % of Co, 3–12 weight % of Cr and balance substantially Ni which has a structure comprising dispersion phases consisting essentially of one or more elements constituting said target member and having a maximum permeability of 50 or less.

4,941,921

## METHOD OF ADDING BORIC ACID OF A BORATE TO A MIXING CER-1 OR REACTION ZONE

Jure Anic, Krefeld, Fed. Rep. of Germany; Walburga Dedericks, Brussels; Lucas E. A. Huybrechts, Kontich, both of Belgium, and Harry Johnson, Stockport, England, assignors to Cerestar Holding DV, Vilvoorde, Belgium

Filed Jan. 11, 1989, Ser. No. 295,815

Claims priority, application United Kingdom, Jan. 11, 1988, 8800502

Int. Cl.[5] C08L 3/00

U.S. Cl. 106—213 18 Claims

1. A process which includes the step of adding boric acid or a borate to a mixing or reaction zone, wherein the boric acid or borate is added in the form of a liquid composition containing monoethanolamine or a polyhydroxyorganic compound selected from the group consisting of a sugar alcohol, a pentose, a hexose, a hexulose, sucrose, starch hydrolysates and hydrogenated starch hydrolysates.

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4,941,922

## STARCH-BASED CORRUGATING ADHESIVE CONTAINING FIBERS

Peter A. Snyder, Charlotte, N.C., assignor to Harper/Love Adhesives Corporation, Charlotte, N.C.

Filed Mar. 20, 1989, Ser. No. 325,930

Int. Cl.[5] C09J 103/00

U.S. Cl. 106—214 13 Claims

1. An improved starch-based corrugating adhesive which consists essentially of:

a corrugating adhesive including an aqueous mixture of starch, said adhesive being of a type selected from the group consisting of carrier, no-carrier, and carrier-no-carrier adhesives; and

a quantity of fibers dispersed within said corrugating adhesive, said fibers being present in said corrugating adhesive in an amount of from about 2.2 to about 22 pounds of fiber per 100 gallons of corrugating adhesive, said fibers having a diameter range of between about 0.0005 inches and about 0.02 inches, said fibers having a length of between about 0.025 inches and about 0.25 inches.

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4,941,923

## WATER-INSOLUBLE BLACK PIGMENT

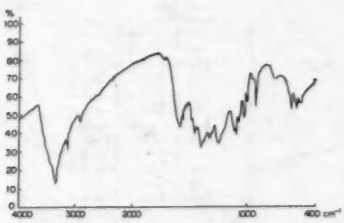
Teruhito Sotogoshi, Saitama; Yukio Ishizaka, and Katsunori Nakamura, both of Tokyo, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Jan. 6, 1989, Ser. No. 294,162

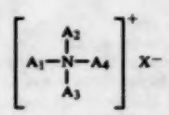
Claims priority, application Japan, Jan. 18, 1988, 63-6996

Int. Cl.[5] C08K 5/16, 5/00

U.S. Cl. 106—498 7 Claims




1. A water-insoluble black pigment produced by reacting C. I. Solubilized Sulphur Black 1 with a salt-forming agent selected from the group consisting of inorganic acid salts of alkylamine, alkoxyalkylamine, alkanolamine, carboxyalkylamine, alkylcarboxamide, allylamine, amide of unsaturated carboxylic acid, cyclic amine, cycloalkylamine, oxacycloalkylamine, morpholine derivative, arylamine, aralkylamine, pyridine derivative, quinoline, phthalimide, DL-α-amino-ε-caprolactam and ε-aminocaprolactam, and ammonium salt of the formula (I):




(I)

wherein $A_1$, $A_2$, $A_3$ and $A_4$ each represent an alkyl or phenyl group and $X^-$ represents an anionic group.

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4,941,924

## CHEMICAL SOIL STABILIZATION

Ervin Merritt, Mineral Wells, Tex., assignor to Chemical Soil Stabilization Technology, Inc., Aledo, Tex.

Continuation of Ser. No. 160,024, Feb. 25, 1988, abandoned. This application Aug. 22, 1988, Ser. No. 236,346

Int. Cl.[5] E01C 7/36

U.S. Cl. 106—900 13 Claims

1. A method of stabilizing a cohesive soil having a plasticity index of at least 7, comprising the steps of:

a. admixing sulfuric acid, citrus stripper oil, and water in a predetermined volumetric proportion to said soil to form a treated soil, said predetermined proportion comprising at least 0.01% concentrated sulfuric acid to said soil, at least 3% citrus stripper oil to 97% concentrated sulfuric acid, and an appropriate amount of water to said soil to form a treated soil that is satisfactorily packable;

b. packing said treated soil to consolidate said soil, wherein the compressive strength of said treated and consolidated soil is increased compared to the compressive strength of the untreated soil.

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4,941,925

## CLEANER FOR HIGH PRESSURE CLEANING OF FERROUS AND NON-FERROUS MATERIAL

E. Michael Kerr, Naperville, and Bernard R. Szyszko, Warrenville, both of Ill., assignors to Nalco Chemical Company, Naperville, Ill.

Continuation of Ser. No. 160,732, Feb. 26, 1988, abandoned. This application Nov. 21, 1989, Ser. No. 439,847

Int. Cl.[5] B08B 3/08

U.S. Cl. 134—3 6 Claims

1. An improved method of spray cleaning of ferrous and non-ferrous metal surfaces to remove metal working compounds, swarf and chips from said surfaces which comprises spraying onto a ferrous or non-ferrous surface that is contaminated with at least one of metal working compounds, swarf and chips an aqueous detergent solution, the improvement comprising using as the detergent a composition consisting essentially of an aliphatic dicarboxylic acid having the formula of

$$HO_2C-(CH_2)_n-CO_2H$$

wherein n is an integer of from 4 to 10 and mixtures thereof, in water-soluble alkanolamine salt form.

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4,941,926

## INHIBITING POPCORN POLYMER FORMATION

Sadao Nakajima, Mie-ken, Japan, assignor to Hakuto Chemical Co., Ltd., Tokyo, Japan

Filed Apr. 28, 1989, Ser. No. 345,352

Int. Cl.[5] B08B 9/00

U.S. Cl. 134—22.19 7 Claims

1. A method for the inhibition of popcorn polymer formation in an olefin production apparatus, said method comprising treating the inner surface of the apparatus with an efficient amount of a surface-treating agent diluted with water so as to

include an aqueous solution of an organic acid and/or salts thereof as a main component in a concentration of 0.5 to 10 weight percent while the operation of the olefin production apparatus is suspended and olefins are substantially removed from the apparatus,

said surface-treating agent comprising:

100 weight parts of the surface-treating agent,

(a) at least one compound selected from the group consisting of citric acid, glycolic acid, gluconic acid, ethylene diamine-tetraacetic acid (EDTA), N-hydroxylethyl ethylene diamine-N,N',N'-triacetic acid (HEDTA), diethylene triamine-N,N,N',N'',N''-pentaacetic acid (DTPA), nitrile triacetic acid (NTA), triethylenetetramine-N,N,N',N'',N''',N'''-hexaacetic acid (TTHA), and hydroxyethylimino diacetic acid (HEIDA), oxalic acid, sulfamic acid, tartaric acid, formic acid, acetic acid, thioglycolic acid, malic acid, succinic acid, and benzene sulfonic acid, and salts of sodium, potassium, amine and ammonium thereof in an amount of from 10 to 50 weight parts;

and at least one member selected from the group consisting of (b) a corrosion-resistant agent, in an amount of 0.5 to 5 weight parts; (c) a reducing agent in an amount of 0.5 to 5 weight parts and (d) a penetrant in an amount of 0.25 to 5 weight parts; and balance being water.

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**4,941,927**

**FABRICATION OF 18% NI MARAGING STEEL LAMINATES BY ROLL BONDING**

**Charles F. Hickey, Jr., Ashland, Mass., and Timothy S. Thomas, Springfield, Va., assignors to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Apr. 26, 1989, Ser. No. 343,778**

**Int. Cl.[5] C21D *8/02***

**U.S. Cl. 148—11.5 Q** **4 Claims**

1. A method of fabricating a laminate of at least two layers of maraging steel comprising in combination the steps of:

a. providing a quantity of stock of a first maraging steel alloy;

b. providing a quantity of stock of a second maraging steel alloy;

c. melting each of said alloys to form an ingot of selecting size;

d. heating said ingots to a selected forging temperature;

e. forging said ingots into slabs of a selected size;

f. heating said slabs to a selected rolling temperature;

g. rolling said slabs into plates of a selected size;

h. grinding at least one surface of each of said plates flat to a selected tolerance;

i. placing said flat surfaces in mutual contact;

j. heating said plates to a selected roll bonding temperature;

k. rolling said plates to effect the bond to form said laminate;

l. air cooling said laminate to ambient temperature.

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**4,941,928**

**METHOD OF FABRICATING SHAPED BRITTLE INTERMETALLIC COMPOUNDS**

**Robert L. Ammon, Baldwin Boro; Raymond W. Buckman, Pleasant Hills, and George P. Sabol, Murrysville, all of Pa., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Dec. 30, 1988, Ser. No. 292,033**

**Int. Cl.[5] B23K *20/14***

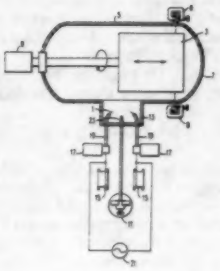
**U.S. Cl. 148—2** **13 Claims**

1. A method of fabricating shapes of brittle intermetallic compounds of various metals comprising the steps of

forming two bimetallic wires of predetermined quantities of two different metals;

utilizing the wires that include the two different metals in an arc spray process to spray molten droplets of the two metals from the wires on a target to form an overlay of a desired brittle intermetallic compound of the two metals on the target;

removing the intermetallic compound overlay from the target; and



densifying the overlay removed from the target to form a full density intermetallic shape.

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**4,941,929**

**SOLDER PASTE FORMULATION CONTAINING STANNOUS FLUORIDE**

**Berhan Tecle, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Aug. 24, 1989, Ser. No. 398,195**

**Int. Cl.[5] B23K *35/34***

**U.S. Cl. 148—24** **20 Claims**

1. An improved solder paste composition suitable for screen or stencil printing with a capability for low ionic contamination after use of the paste in a soldering operation comprising

(a) a metal or metal alloy,

(b) a carrier, and

(c) stannous fluoride which composition after soldering and without a cleaning step has an ionic contamination not greater than 2 micrograms NaCl equivalent/sq. inch.

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**4,941,930**

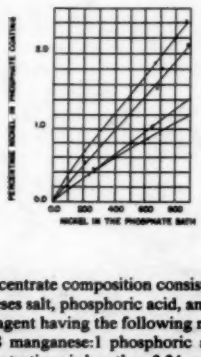
**PHOSPHATE COATING COMPOSITION AND METHOD OF APPLYING A ZINC-NICKEL PHOSPHATE COATING**

**Harry R. Charles, Sterling Heights; Thomas W. Cape, West Bloomfield, and Donald L. Miles, Farmington Hills, all of Mich., assignors to Chemfil Corporation, Troy, Mich.**

**Division of Ser. No. 912,754, Sep. 26, 1986, Pat. No. 4,793,867. This application Sep. 12, 1988, Ser. No. 242,986**

**Int. Cl.[5] C23C *22/18***

**U.S. Cl. 148—260** **6 Claims**




1. A liquid concentrate composition consisting essentially of divalent manganeses salt, phosphoric acid, and a nitrogen-containing reducing agent having the following molar proportions—0.001 to 0.388 manganese:1 phosphoric acid wherein the manganese concentrations is less than 2.24 moles per liter; and at least 0.05 nitrogen-containing reducing agent:1 manganese

wherein the nitrogen containing reducing agent is hydroxylamine sulfate, hydrazine sulfate, sodium nitrite, potassium nitrite, or ammonium nitrite.

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**4,941,931**

## GAS-GENERATED EXPANDABLE BEADS AS BURNING RATE ACCELERATORS

**David C. Sayles, Huntsville, Ala., assignor to The United States of America as represented by the Secretary of the Army, Washington, D.C.**

**Filed Aug. 26, 1983, Ser. No. 528,198**

**Int. Cl.[5] C06B *45/10***

**U.S. Cl. 149—19.2** **3 Claims**

1. In a composite propellant composition consisting essentially in weight percents of the ingredients as follows:

| | |
|---|---|
| aluminum powder | 12.0 |
| ammonium perchlorate (70 μm) | 73.0 |
| n-hexylcarborane | 6.0 |
| hydroxyl-terminated polybutadiene prepolymer | 6.0 |
| trimethylolpropane (additive) | 0.06 |
| wetting agent (reaction product of equimolar quantities of 12-hydroxystearic acid and tris[2-methylaziridinyl]phosphine oxide) (additive) | 0.30 |
| isophorone diisocyanate (additive) | 0.70; |

the improvement in burning rate achieved by incorporation into said composite composition during propellant mixing from about 2.0 to about 4.0 weight percent of gas-generated-expandable beads comprised of a blowing agent selected from 4-toluenesulfonyl hydrazide and 4,4'-oxybis(benzenesulfonyl hydrazide) which is coated with a bead forming material consisting of about 95 parts of hydroxy-terminated polybutadiene prepolymer, of about 5 parts of trimethololpropane, and of about 6 parts of isophorone diisocyanate, said coated gas-generated-expandable beads being physically dispersed in said composite propellant composition and chemically crosslinked in said composite propellant composition during curing of said composite propellant composition to form a solid propellant grain, said gas-generated-expandable beads containing about 5–8% by weight of said selected blowing agent that results in bead expansion or rupture during propellant burning when the flame front reaches said gas-generated-expandable bead, said bead expansion or rupture bringing about disruption of the propellant's surface to permit flame penetration into the propellant to thereby achieve a major increase in burning rate of said propellant composition.

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**4,941,932**

## METHOD FOR SEALING A CABLE BUNDLE IN LONGITUDINAL DIRECTION

**Gunther John, Hamburg, Fed. Rep. of Germany, assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Jun. 26, 1989, Ser. No. 371,516**

**Claims priority, application Fed. Rep. of Germany, Jul. 9, 1988, 3823312**

**Int. Cl.[5] H01B *13/06***

**U.S. Cl. 156—48** **7 Claims**

1. A method for sealing the interstices between individual cables of a cable bundle to achieve a sealing of said cable bundle in the longitudinal direction thereof, comprising applying a curable liquid resin system to the area between said cables, said resin system comprising the reaction product of a polyisocyanate and at least one fatty acid polyol having a hydroxyl number of at least about 150 and an acid number of no greater than about 1.0, followed by curing thereof to a non-flowable state.

**4,941,933**

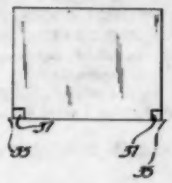
## METHOD OF MAKING A BODY MEMBER CONFORMABLE DISPOSABLE ARTICLES

**Ralf Korpman, Bridgewater, N.J., assignor to Johnson & Johnson, New Brunswick, N.J.**

**Continuation of Ser. No. 926,601, Nov. 3, 1983, abandoned, Division of Ser. No. 838,440, Mar. 10, 1986, Pat. No. 4,662,874. This application Nov. 9, 1988, Ser. No. 269,275**

**Int. Cl.[5] B32B *31/20***

**U.S. Cl. 156—160** **9 Claims**




1. A process for preparing a body member conformable disposable article comprising: p1 (a) an electric thermoplastic moisture impermeable backing film, and

(b) an absorbent layer superposed thereon, at least one portion of at least one edge of said backing film, at a position to be fitted around a body member of the wearer, having been folded upon itself and sealed together at the fold, so that when said backing film is laid flat said one edge thereof is in stretched condition; which process comprises providing an elastic thermoplastic moisture impermeable backing film, folding at least one portion of at least one edge of said backing film upon itself around a fold line running transversely of said one edge and forming at least one pinched portion at the fold by sealed a portion of the folded edge of said backing film together at the fold, providing an absorbent layer, and affixing the absorbent layer to the backing film.

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**4,941,934**

## METHOD OF MAKING PROTECTIVE CAPS FOR THREADED PIPE ENDS OR PIPE SOCKETS AND PROTECTIVE CAP MADE BY SAID METHOD

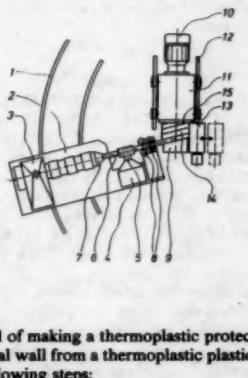
**Winfried Reu, Goethestrasse 27, 4700 Hamm, Fed. Rep. of Germany**

**Filed Nov. 2, 1988, Ser. No. 262,991**

**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1987, 3738417**

**Int. Cl.[5] B32B *1/00***

**U.S. Cl. 156—195** **24 Claims**




1. A method of making a thermoplastic protective cap having a cylindrical wall from a thermoplastic plastic profile comprising the following steps:

heating the thermoplastic plastic profile;

winding the thermoplastic plastic profile in helically overlapping form onto a mandrel to obtain a wall thickness of between ten and ninety percent of total cap wall thickness; and

winding a thermoplastic plastic profile containing a reinforcing material in helically overlapping form onto mandrel containing said thermoplastic plastic profile to obtain the remainder of the cap wall thickness.

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**4,941,935**

## PROCESS FOR HIGH SPEED COATING OF SUBSTRATES

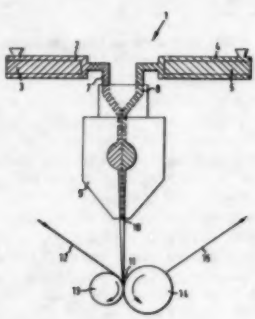
**Bertram H. Gregory, Aartselaar, Belgium, assignor to Exxon Chemical Patents Inc., Linden, N.J.**

**Filed Nov. 9, 1988, Ser. No. 269,213**

**Claims priority, application United Kingdom, Sep. 11, 1987, 8726202**

**Int. Cl.[5] B29C *47/06***

**U.S. Cl. 156—243** **18 Claims**



1. A process for high speed coating a substrate moving at a line speed of over 50 m/min comprising co-extruding onto the substrate a layer of an olefin terpolymer tie resin and a layer of polypropylene by combining the terpolymer and polypropylene layers to form a molten co-extruded web and contacting said molten co-extruded web with said substrate, the olefin terpolymer tie resin being between the substrate and the polypropylene wherein the olefin terpolymer tie resin is a terpolymer of ethylene or propylene, an unsaturated carboxylic acid having 3 to 8 carbon atoms or an anhydride having 4 to 8 carbon atoms and an unsaturated ester; provided, the amount of carboxylic acid or anhydride groups in the terpolymer is at least 3 mole % and the amount of ester groups in the terpolymer is at least 3 mole %.

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**4,941,936**

## METHOD FOR BONDING FRP MEMBERS VIA DIELECTRIC HEATING

**Robert E. Wilkinson, Birmingham; Kenneth A. Iseler, Richmond, both of Mich.; Rueben L. Smith, Findlay, Ohio; Lorenz K. E. Duerr, Schenectady, and Harry M. Cargile, Ballston Lake, both of N.Y., assignors to The Budd Company, Troy, Mich. and LaRose RF Systems, Inc., Millis, Mass.**

**Filed Apr. 28, 1988, Ser. No. 187,358**

**Int. Cl.[5] B32B *31/20, 31/28***

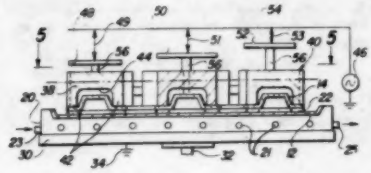
**U.S. Cl. 156—274.8** **7 Claims**

1. A method of bonding a cured plastic member to a reinforcement member, said method comprising:

forming an assembly by placing an uncured thermosetting adhesive between mating surfaces of the cured plastic member and the reinforcement member;

placing the assembly between two electrodes, one of said electrodes including a plurality of electrically isolated concentrator members; and

applying a high frequency signal having a frequency of between about 10 megahertz to about 110 megahertz at a voltage of between about 300 to about 8000 volts to the electrodes from a dielectric heater for a period of time



from about 15 seconds to about 120 second which is sufficient to cure the adhesive, said concentrator members providing even concentration of energy from the high frequency signal at selected areas of the adhesive such that the plastic member is bonded to the reinforcement member without substantial adverse affect to the surface quality of the plastic member.

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**4,941,937**

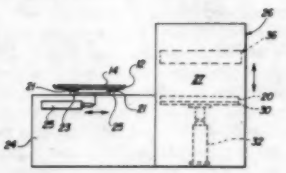
## METHOD FOR BONDING REINFORCEMENT MEMBERS TO FRP PANELS

**Kenneth A. Iseler, Richmond, and Robert E. Wilkinson, Birmingham, both of Mich., assignors to The Budd Company, Troy, Mich.**

**Filed Apr. 28, 1988, Ser. No. 187,359**

**Int. Cl.[5] B32B *31/20, 31/28***

**U.S. Cl. 156—274.8** **13 Claims**



11. A method of bonding to a reinforcement member an exterior automotive body skin having a surface area of at least one square foot and a length in at least one dimension exceeding 47 inches, said method comprising the steps of:

forming the skin and reinforcement member by compression molding charges of thermosetting sheet molding compound, with the reinforcement member being configured so as to have a hat shaped cross section with a dome and pair of flanges;

applying a bead of heat curable, two part epoxy adhesive containing a resin and hardener onto the flanges of the reinforcement member;

placing the reinforcement member onto the skin to form an assembly;

inserting the assembly between electrodes in a dielectric heater;

applying an alternating electrical signal having a frequency of between about 10 megahertz to about 110 megahertz at a voltage of between about 300 to about 8000 volts between the electrodes for a period of time from about 15 seconds to about 120 seconds to form a bonded reinforced panel assembly; and

removing the reinforced panel assembly from the nest.

4,941,938

## METHOD OF JOINING MATERIALS

Ingvar Karlsson, Bandhagen, Sweden, assignor to Casco Nobel AB, Stockholm, Sweden

PCT No. PCT/SE87/00061, § 371 Date Jul. 6, 1988, § 102(e) Date Jul. 6, 1988, PCT Pub. No. WO87/05041, PCT Pub. Date Aug. 27, 1987
PCT Filed Feb. 10, 1987, Ser. No. 216,719
Claims priority, application Sweden, Feb. 17, 1986, 8600694
Int. Cl.[5] B32B *31/00*
U.S. Cl. 156—281 11 Claims

1. A method of joining two or more surfaces together by

(1) applying to at least one of the surfaces a water based adhesive or an adhesive which liberates water during curing, and

(2) generating a salt or salts during the course of the joining operation, which salt will bind water that is present during the joining as water of crystallization.

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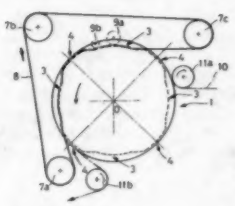
4,941,939

## APPARATUS FOR APPLYING AN ELASTIC BAND ONTO A MOVING WEB

Hironori Nomura, Iyomishima; Taiji Shimakawa, Kawanoe; Junji Shinohara, Iyomishima; Shigetoyo Kobayashi, Kagawa, and Hiroki Yamamoto, Kawanoe, all of Japan, assignors to Uni-Charm Corporation, Ehime, Japan

Division of Ser. No. 215,359, Jul. 5, 1988, Pat. No. 4,838,969.
This application Feb. 28, 1989, Ser. No. 291,645
Claims priority, application Japan, Jul. 3, 1987, 62-166523
Int. Cl.[5] B32B *31/16*
U.S. Cl. 156—495 7 Claims




1. An apparatus for combining a web as a primary component with at least two longitudinal elastic bands so as to affix the elastic bands onto said web in a spaced apart relationship, said apparatus comprising:

(A) a generally circular main support member (1),

(B) a plurality of unevenly contoured segments located around the periphery of said support member (1), each of said contoured segments being composed of a central area (3) that includes:

(a) a middle portion (5),

(b) sloping areas (6) extending from opposite ends of said middle portion (5) to end areas (4), and

(c) vertical edge areas (2) formed along opposite sides of said central area (3),

(C) means (8) to press a web (10) against said plurality of contoured segments, and

(D) means to affix pairs of elastic bands substantially in parallel to each other onto said web at those portions of the web which extend outwardly from said edge areas (2) while said web is being pressed against and folded in conformity with said unevenly contoured peripheral segment.

4,941,940

## PRE-SWELLING AND ETCHING OF PLASTICS FOR PLATING

Gordhanbhai N. Patel, Somerset; Durgadas Bolikal, Highland Park, both of N.J., and Richard A. Bellemare, Watertown, Conn., assignors to JP Laboratories, Inc., Piscataway, N.J.

Filed Nov. 7, 1988, Ser. No. 268,154
Int. Cl.[5] B05D *3/10*
U.S. Cl. 156—628 11 Claims

1. A process of two step surface etching of polymeric materials made of polymers having at least one hydrolyzable functionallty selected from the group consisting of polycarbonates, anhydrides, carboxyl esters, sulphonic esters, amides and urethanes, which comprises

the first step of exposing the surface to be etched to a liquid phase capable of microroughening said surface, comprising a good solvent for said polymer and a non-solvent for said polymer provided that where at least one member of the group of said good and said non solvents etchant is immiscible with the other, said liquid phase further comprises a sufficient amount of solubilizing agent miscible with said immiscible components to provide a single liquid phase and

a second step of hydrolyzing the said functionalities on said surface to the extent needed to provide a water wettable surface capable of being plated with electroless nickel or electroless copper to provide a plated layer having a strong level of adhesion to said surface by treating said surface with an etchant selected from the group consisting of

acidic etchants selected from the group consisting of aqueous mineral acids free of metallic components, benzene sulphonic acid and mixtures thereof and basic etchants selected from the group consisting of alkali metal hydroxides, quaternary ammonium hydroxides and mixtures thereof in the presence of triethanolamine.

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4,941,941

## METHOD OF ANISOTROPICALLY ETCHING SILICON WAFERS AND WAFER ETCHING SOLUTION

Larry W. Austin, Hinesburg, and Harold G. Linde, Richmond, both of Vt., assignors to International Business Machines Corporation, Armonk, N.Y.

Filed Oct. 3, 1989, Ser. No. 416,337
Int. Cl.[5] H01L *21/306*; B44C *1/22*; C09K *13/00*; C03C *15/00*
U.S. Cl. 156—647 28 Claims

1. A method of etching silicon, comprising contacting said silicon with an etching solution which comprises an aromatic compound having at least two adjacent hydroxyl groups and a polar functional group on the ring, an amine and water.

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4,941,942

## METHOD OF MANUFACTURING A MASK SUPPORT OF SIC FOR X-RAY LITHOGRAPHY MASKS

Angelika M. Bruns, Henstedt-Ulzburg; Margret Harms, Hamburg; Holger K. G. Luthje, Halstenbek, and Bernd Matthiessen, Seevetal, all of Fed. Rep. of Germany, assignors to U.S. Philips Corporation, New York, N.Y.

Filed Sep. 29, 1988, Ser. No. 251,630
Claims priority, application Fed. Rep. of Germany, Oct. 2, 1987, 3733311
Int. Cl.[5] B44C *1/22*
U.S. Cl. 156—657 16 Claims

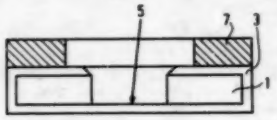
1. A method of manufacturing a mask support or membrane of SiC for X-ray lithography masks comprising the steps of

(a) heating a monocrystalline silicon wafer to a temperture in the range of from 1000° to 1350° C. in a $H_2$ atmosphere, said monocrystalline silicon wafer having two major surfaces,

(b) then etching the heatd monocrystalline silicon wafer and subsequently rinsing the etched monocrystalline silicon wafer under the influence of $H_2$,

(c) depositing a layer of SiC on the rinsed monocrystalline silicon wafer in a gas atmosphere of silicon and hydrocarbons, said layer of SiC coating at least one of said two major surfaces of said monocrystalline silicon wafer,

(d) cooling the coated monocrystalline silicon wafer to ambient temperature in a $H_2$ atmosphere,




(e) implanting ions into said layer of SiC for mechanically disturbing the crystal structure of said layer of SiC, and

(f) selectively removing said monocrystalline silicon from said layer of SiC except at edges of said monocrystalline silicon wafer, thereby exposing both sides of said layer of SiC.

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**4,941,943**

**PROCESS FOR PREPARING SODIUM CARBOXY-METHYL CELLULOSE**

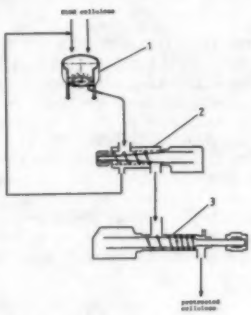
**Kari Edelman, Palokka, and Torsten Lindroos, Äänekoski, both of Finland, assignors to Metsa-Serla Oy, Kirkniemi, Finland**

**Filed Jan. 27, 1988, Ser. No. 148,951**

**Claims priority, application Finland, Jan. 27, 1987, 870360**

**Int. Cl.[5] C08B *11/00*; D21H *13/04***

**U.S. Cl. 162—9** **9 Claims**




1. A process for preparing sodium carboxy-methyl cellulose, comprising:

(a) conducting a pretreatment which includes:

(i) slushing cellulose into a reaction medium until a fiber suspension having a consistency of about 5 to 15 percent is achieved;

(ii) thereafter thickening said fiber suspension until a pulp-containing reaction medium having a consistency of about 20 to 35 percent is achieved;

(iii) thereafter homogenizing said pulp-containing reaction medium using a screw conveyor having a screw pitch which decreases from an inlet opening thereof towards an outlet opening thereof, and thereby increasing the reactivity of said pulp; and

(iv) after conducting step (ii), mercerizing said pulp, thereby activating cellulose therein; and

(b) etherifying said activated cellulose.

**4,941,944**

**METHOD FOR CONTINUOUS COUNTERCURRENT OGRANOSOLV SACCHARIFICATION OF COMMINUTED LIGNOCELLULOSIC MATERIALS**

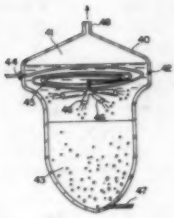
**Robert P. Chang, Burnaby, Canada, assignor to Pierre A. Tonachel, New York, N.Y.**

**Continuation of Ser. No. 712,784, Mar. 18, 1985, abandoned. This application Jan. 2, 1990, Ser. No. 460,042**

**Claims priority, application Canada, Jul. 13, 1984, 458893**

**Int. Cl.[5] D21C *3/20***

**U.S. Cl. 162—19** **14 Claims**




7. A method of dissolving lignin and sugar substances from comminuted lignocellulosic material at elevated temperatures and pressures comprising:

(a) introducing comminuted lignocellulosic material into a reaction vessel;

(b) introducing a cooking liquor comprising a major proportion of organic solvent, a minor proportion of water, and a catalytically effective amount of inorganic acid into the reaction vessel;

(c) causing the comminuted lignocellulosic material to be contacted by and dissolved in the cooking liquor wherein the flow of cooking liquor is countercurrent to the flow of lignocellulosic material;

(d) withdrawing cooking liquor from the reaction vessel after the liquor has hydrolyzed and dissolved a substantial amount of the sugars, lignin and other substances in the comminuted lignocellulosic material; and

(e) rapidly cooling the cooking liquor wherein the lignin remains dissolved in the cooking liquor during the cooling.

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**4,941,945**

**METHOD FOR CLARIFYING GREEN LIQUOR**

**Bertil Pettersson, Gävle, Sweden, assignor to Hedemora AB, Hedemora, Sweden**

**PCT No. PCT/SE88/00035, § 371 Date Oct. 12, 1988, § 102(e) Date Oct. 12, 1988, PCT Pub. No. WO88/06203, PCT Pub. Date Aug. 25, 1988**

**PCT Filed Feb. 3, 1988, Ser. No. 259,570**

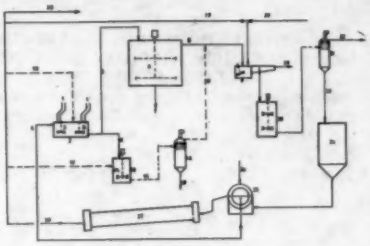
**Claims priority, application Sweden, Feb. 12, 1987, 8709549**

**Int. Cl.[5] D21C *11/04***

**U.S. Cl. 162—29** **8 Claims**

1. Method of clarifying green liquor in a causticizing process by removing solid particles out of unclarified green liquor prior to subsequent complete causticizing of clarified green liquor by adding caustic lime to the clarified liquor, comprising adding caustic lime to the unclarified green liquor during

agitation prior to said removing of the solid particles, said caustic lime added to the unclarified liquor being in an amount



of 0.5–10% of the caustic lime added for said subsequent complete causticizing.

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**4,941,946**

## PROCESS FOR DECREASING THE TENDENCY TO FORM DEPOSITS IN PLANTS FOR EVAPORATING SPENT SULFITE LIQUORS

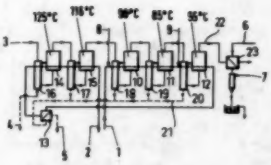
**Manfred Henn, Mainaschaff; Klaus Begerow, Straelen, and Volker Wichert, Voerde, all of Fed. Rep. of Germany, assignors to Metallgesellschaft Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Feb. 6, 1989, Ser. No. 307,679**

**Claims priority, application Fed. Rep. of Germany, Mar. 23, 1988, 3809663**

**Int. Cl.[5] D21C** *11/02;* **C23F** *14/00*

**U.S. Cl. 162—36** **15 Claims**




1. In a process for evaporation of spent sulfite liquor from production of wood pulp, wherein the spent sulfite liquor is passed through a multiple-effect evaporator and is progressively concentrated in an entrance evaporation stage and a succession of evaporation stages downstream from said entrance evaporation stage, the improvement wherein a tendency toward encrustation of calcium sulfate and of silicates on the evaporator is reduced by the steps of:

(a) adding polyacrylic acid which has a low molecular weight of between substantially 500 and 5000 to the spent sulfite liquor at said entrance stage;

(b) adding an aqueous solution of a copolymer of sulfonated styrene and maleic anhydride having a molecular weight between substantially 1,000 and 30,000 to the spent sulfite liquor in at least one of said succession of evaporation stages downstream from said entrance evaporation stage; and

wherein said polyacrylic acid and copolymer are added in amounted effective to reduce the encrustation of calcium sulfate and silicates on the evaporator during concentration of the spent sulfite liquor.

**4,941,947**

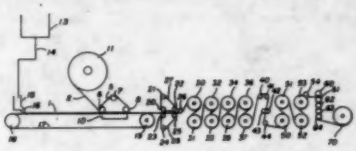
## COMPOSITE FIBROUS POLYETHYLENE SHEET

**Joseph R. Guckert, Midlothian, and Hyun S. Lim, Chesterfield, both of Va., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Sep. 29, 1989, Ser. No. 415,831**

**Int. Cl.[5] B32B** *5/18*

**U.S. Cl. 162—103** **3 Claims**



1. A process for preparing a composite sheet comprising:

depositing polyethylene synthetic pulp on the forming wire of a paper-making machine to form a wet-laid pulp layer,

placing a lightly consolidated flash-spun polyethylene plexifilamentary film-fibril strand sheet atop the wet pulp layer at a point in the paper-making machine where the pulp layer has a water content in the range of 99 to 50% by total weight of the layer to form a sheet assembly, and

then dewatering and drying the assembly to form a composite sheet.

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**4,941,948**

## WOOD POWDER-MOLDED PRODUCTS USING WOOD PULP AS THE BINDING AGENT

**Junsaburo Yamamoto, 3-7-43 Koyanagi-cho, Fuchu-shi, Tokyo, Japan (183)**

**Filed May 19, 1988, Ser. No. 195,865**

**Claims priority, application Japan, May 22, 1987, 62-123881**

**Int. Cl.[5] D21H** *11/08*

**U.S. Cl. 162—142** **2 Claims**

1. A method of manufacturing a molded product of wood powder using a wood pulp binder, comprising:

preparing a solids mixture of 100 parts by weight consisting of 20 to 80 parts by weight wood powder having an average particle size between 10 and 100 mesh and 20 to 80 parts by weight of wood pulp having a beating degree between 170 and 200 C.S.F.;

adding water to the solids mixture in an amount of 15 times the weight of the solids mixture and mixing to form a homogeneous mixture;

adjusting the moisture content of the homogeneous mixture to between 60% and 75%;

molding the homogeneous mixture; and

drying the molded mixture having the adjusted moisture content.

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**4,941,949**

## APPARATUS FOR MANUFACTURING TEXTURED ACOUSTICAL TILE

**Myron M. Luszczak, Palatine, Ill., assignor to USG Interiors, Inc., Chicago, Ill.**

**Division of Ser. No. 861, Jan. 6, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 319,937**

**Int. Cl.[5] D21F** *9/04*

**U.S. Cl. 162—310** **1 Claim**

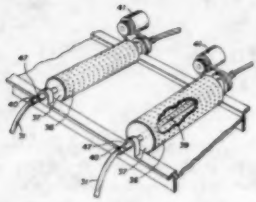
1. Apparatus for producing a three-dimensional texture pattern in the surface of ceiling tile on a moving wet pulp ceiling tile board manufacturing line comprising:

at least one hollow, rotatable, pressurized air cylinder of a first diameter, said cylinder having a plurality of spaced apart perforations penetrating through said cylinder disposed substantially throughout the surface of said cylinder;

an air pressure pipeline coaxially disposed within said air cylinder, said pipeline having a second diameter substantially less than said first diameter and further having a plurality of spaced apart perforations penetrating through said pipeline disposed substantially throughout the surface of said pipeline D';

means for supplying positively pressurized air to said pipeline;

at least one drive motor connected to said cylinder to provide rotation of the cylinder;



means for conveying a wet pulp ceiling tile composition below said air cylinder with the exposed surface of said composition spaced apart from the surface of said air cylinder;

whereby positively pressurized air passes through the perforations in said pipeline into the hollow space between the surface of the pipeline and the surface of the air cylinder, then through the perforations in the rotating cylinder and impinging on the surface of the wet pulp to produce a textured pattern on the wet pulp surface.

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**4,941,950**

**HEADBOX WITH GROOVED TRAILING ELEMENT**

**Charles L. Sanford, Beloit, Wis., assignor to Beloit Corporation, Beloit, Wis.**

**Filed Jul. 26, 1989, Ser. No. 385,530**

**Int. Cl.[5] D21F *1/02***

**U.S. Cl. 162—343** **18 Claims**

1. In a headbox of a web forming apparatus, a trailing element device for dividing a flow of stock flowing through a slice chamber of said headbox towards a slice lip of said headbox, said trailing element device comprising:

a rectangular sheet having an upstream and a downstream end and a first and a second surface;

said upstream end of said sheet being pivotally secured within said slice chamber for dividing the flow of stock into a first and a second current;

said downstream end of said sheet freely floating adjacent to the slice lip such that said first current of stock flows past said first surface and said second current of stock flows past said second surface so that turbulence within the slice chamber is reduced;

said first and second surfaces of said sheet defining respectively a first and a second plurality of parallel-spaced grooves extending in a direction from said upstream to said downstream end of said sheet for inhibiting the formation of machine direction vortices within said first and second currents respectively that would otherwise cause streaking of the resultant web; and

each of said grooves extending from said upstream end of said sheet and terminating short of said downstream end of said sheet.

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**4,941,951**

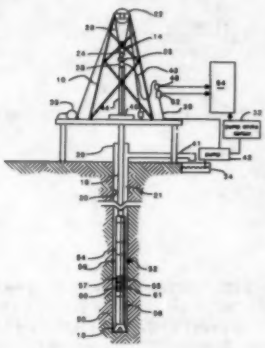
**METHOD FOR IMPROVING A DRILLING PROCESS BY CHARACTERIZING THE HYDRAULICS OF THE DRILLING SYSTEM**

**Michael Sheppard, Missouri City, and Zhian Hedayati, Houston, both of Tex., assignors to Anadrill, Inc., Sugar Land, Tex.**

**Filed Feb. 27, 1989, Ser. No. 316,251**

**Int. Cl.[5] E21B *47/06***

**U.S. Cl. 175—48** **13 Claims**



1. A method for improving the understanding of the process of drilling a borehole through a subsurface geological formation with a drill string at the bottom of which is a drill bit and through which drilling fluids are circulated, comprising the steps of:

a. providing measuring devices near the bottom of the drill string for measuring the pressure drop across the drill bit and the axial load placed on the drill bit;

b. raising the drill string to lift the drill bit off of the bottom of the borehole so that the axial load placed on the bit due to the weight of the drill string is reduced to zero;

c. making a first measurement indicative of the pressure drop across the drill bit at a plurality of different flow rates while at the same time making a second measurement indicative of the signal from the measuring device for measuring axial load on the drill bit;

d. combining said first and second measurements to obtain a constant representative of the rate of change of said first measurement relative to the rate of change of said second measurement;

e. drilling said formation while determining the weight on the drill bit and the pressure drop across the drill bit; and

f. combining said weight on the drill bit, said pressure drop across the drill bit and said constant in order to generate a weight on bit signal corrected for the effects of pressure drop across the drill bit.

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**4,941,952**

**PROCESS FOR THE TREATMENT OF WASTE MATERIAL**

**Monika Betz, Ketsch, Fed. Rep. of Germany, assignor to Asea Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany**

**Filed May 22, 1989, Ser. No. 355,405**

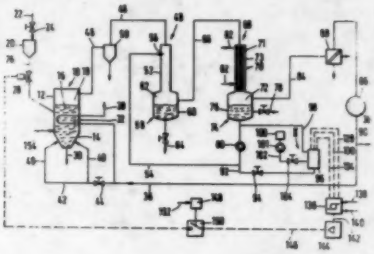
**Claims priority, application Fed. Rep. of Germany, May 21, 1988, 3817437**

**Int. Cl.[5] C10B *53/00***

**U.S. Cl. 201—1** **12 Claims**

1. Process for the treatment of hydrocarbon-containing

waste material, which comprises subjecting the waste material to pyrolysis with the addition of an additive material binding acidic pollutants, feeding pyrolysis gas formed during pyrolysis to at least one first precooling stage, feeding the pyrolysis gas to at least one second cooling stage downstream of the at least one first precooling stage in gas flow direction, cooling the at least one second cooling stage to a temperature below the condensation temperature of water vapor for obtaining



low-boiling pyrolysis oil, mixing a solubilizer and water with the diverted part of the low-boiling pyrolysis oil, measuring the pH value of the mixture, comparing the measured pH value of the mixture with a predetermined pH range, correcting the addition of the additive material by automatically reducing the addition of additive material upon a rise in pH value outside the predetermined pH range, and automatically increasing the addition of additive material upon a fall in pH value outside the predetermined pH range.

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**4,941,953**

## DURABLE ELECTRODES HAVING A PLATED TINOR TIN OXIDE INTERMEDIATE LAYER FOR ELECTROLYSIS AND PROCESS FOR PRODUCING THE SAME

**Yukiei Matsumoto, Kanagawa, and Takayuki Shimamune, Tokyo, both of Japan, assignors to Permelec Electrode Ltd., Kanagawa, Japan**

**Continuation of Ser. No. 52,938, May 22, 1987, abandoned. This application Jun. 5, 1989, Ser. No. 361,727**

**Claims priority, application Japan, May 22, 1986, 61-116232**

**Int. Cl.[5] C25D *3/30*; C25B *11/06***

**U.S. Cl. 204—541** **13 Claims**

1. An electrode for electrolysis comprising an electrode substrate made of a conductive metal having provided thereon an intermediate layer and a coating of an electrode active substance, said intermediate layer being a dense, non-porous layer and formed by tin-plating and consisting of at least one of tin and tin oxide.

7. A process for producing an electrode for electrolysis which comprises plating tin on an electrode substrate made of a conductive metal to form a dense, non-porous intermediate layer consisting of tin, and coating an electrode active substance thereon.

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**4,941,954**

## ELECTROCHEMICAL PREPARATION OF BRANCHED UNSATURATED DINITRILES

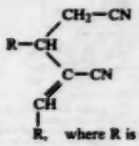
**James Y. Becker, Omer, Israel, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed May 8, 1989, Ser. No. 349,243**

**Int. Cl.[5] C25B *3/00***

**U.S. Cl. 204—59 R** **9 Claims**

1. A process for the non-symmetric dimerization of an aliphatic unsaturated nitrile having 4 or 5 carbon atoms which comprises passing a direct electric current between electrodes located in a non-aqueous reaction mixture containing the aliphatic unsaturated nitrile and an electrolyte, and recovering a branched aliphatic unsaturated dinitrile in which there is an odd number of carbon atoms between the cyano-groups and having the formula:



where R is $C_2H_5$ or $CH_3$

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**4,941,955**

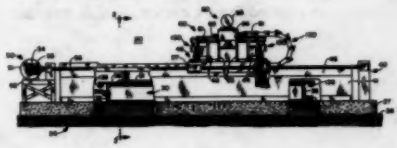
## APPARATUS AND METHOD FOR ELECTROCHEMICAL MACHINING OF FLAT PLATES OR SHEETS

**John E. Schuster, Flossmoor, Ill., assignor to The Interlake Companies, Inc., Oak Brook, Ill.**

**Continuation-in-part of Ser. No. 69,865, Jul. 6, 1987, Pat. No. 4,820,390. This application Feb. 1, 1989, Ser. No. 305,456**

**Int. Cl.[5] B23H *3/10, 7/32***

**U.S. Cl. 204—129.5** **21 Claims**



19. A method for electrochemical machining of one of the opposed surfaces of a flat metal workpiece in the form of a plate or sheet, said method comprising the steps of: supporting the workpiece on a first electrode having a flat support surface such that the support surface is disposed in electrical and rigid supporting contact with the surface of the workpiece opposite the one surface over the entire area of the workpiece, providing a second electrode having a working face with an area substantially less than the area of the workpiece, supporting the second electrode with its working face disposed a predetermined slight distance from the one surface of the workpiece in facing relationship therewith so as to establish a predetermined working gap between the working face and a predetermined working area of the workpiece, establishing relative movement between the second electrode and the workpiece for sweeping the working face across the entire one surface of the workpiece, continuously flowing an electrolyte fluid through the working gap in contact with the second electrode and with the workpiece at a pressure substantially greater than atmospheric pressure, and applying an electrical potential across the first and second electrodes for promoting a flow of current through the workpiece and the electrolyte and the first and second electrodes to effect electrochemical removal of material from the one surface of the workpiece.

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**4,941,956**

## METHOD OF ENRICHING THE ISOTOPE CARBON 13 BY MEANS OF LASER IRRADIATION

**Shigeyoshi Arai, Kyoto; Kyoko Sugita; Shohei Isomura, both of Tokyo, and Hayato Kaetsu, Saitama, all of Japan, assignors to Rikagaku Kenkyusho, Saitama, Japan**

**Filed Jan. 17, 1989, Ser. No. 297,708**

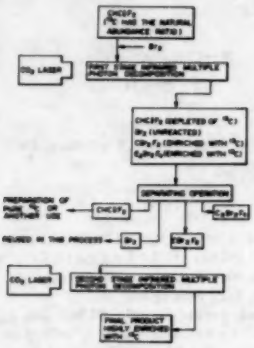
**Claims priority, application Japan, Jan. 21, 1988, 63-11555**

**Int. Cl.[5] B01D *59/34***

**U.S. Cl. 204—157.2** **2 Claims**

2. A method of enriching the isotope carbon 13 by means of laser irradiation, comprising

irradiating a mixture of $CHClF_2$ and $Br_2$ with laser rays emitted from a carbon dioxide gas laser to produce $CBr_2F_2$, and



irradiating a mixture of the produced $CBr_2F_2$ and $O_2$ with laser rays emitted from a carbon dioxide gas laser.

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**4,941,957**

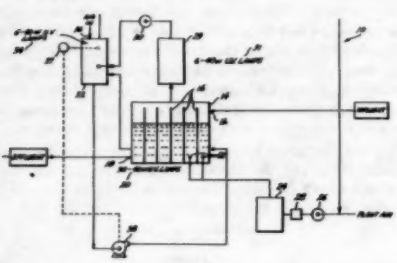
**DECOMPOSITION OF VOLATILE OGRANIC HALOGENATED COMPOUNDS CONTAINED IN GASES AND AQUEOUS SOLUTIONS**

**Jack D. Zeff, Marina del Rey, and Eriks Leitis, Canoga Park, both of Calif., assignors to Ultrox International, Santa Ana, Calif.**

**Continuation-in-part of Ser. No. 921,830, Oct. 22, 1986, Pat. No. 4,780,287, and a continuation of Ser. No. 627,392, Jul. 3, 1984, abandoned. This application Sep. 30, 1988, Ser. No. 250,842**

**Int. Cl.[5] C01B *7/00*; B01J *19/08***

**U.S. Cl. 204—157.3** **6 Claims**



1. A method for decomposing volatile organic halogenated compounds in gases comprising passing gas carrying the volatile organic compounds through a porous adsorbent bed of silica gel while irradiating the porous bed with ultraviolet light and/or exposing the porous adsorbent bed to ozone at a distance effective to promote a decrease in the amount of said volatile organic halogenated compounds and for an amount of time effective to decompose the volatile organic halogenated compounds in said gases.

**4,941,958**

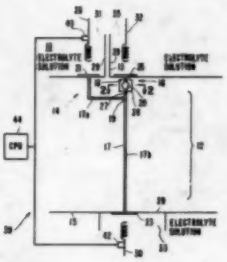
**DEVICE AND METHOD FOR DETECTING IONIC COMPONENTS IN SOLUTION**

**William A. Byers, Penn Hills Township, Allegheny County, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Mar. 8, 1989, Ser. No. 320,648**

**Int. Cl.[5] G01N *27/26, 27/28***

**U.S. Cl. 204—183.3** **23 Claims**



17. A system for detecting ionic components in solution, comprising:

(a) a plurality of detector elements each including:

(i) a first ion exchange medium, and

(ii) a second ion exchange medium contacting the first ion exchange medium and being in fluid communication therewith via an electrolyte solution,

wherein the second ion exchange medium has a higher ion mobility than the first ion exchange medium;

(b) means for effecting an electric field in the electrolyte solution to cause an analyte introduced at the second ion exchange medium to disassociate into ionic components which selectively migrate from the second ion exchange medium to the first ion exchange medium; and

(c) means for controlling and monitoring the plurality of detecting elements.

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**4,941,959**

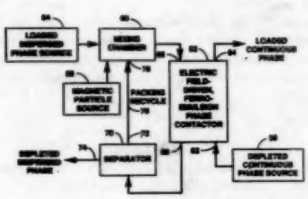
**ELECTRIC FIELD-DRIVEN, MAGNETICALLY-STABILIZED FERRO-EMULSION PHASE CONTACTOR**

**Timothy C. Scott, Knoxville, Tenn., assignor to Martin Marietta Energy Systems, Inc., Oak Ridge, Tenn.**

**Filed Nov. 27, 1989, Ser. No. 441,494**

**Int. Cl.[5] B03C *5/00***

**U.S. Cl. 204—186** **8 Claims**



1. A method for solvent extraction comprising the steps of:

introducing initial droplets of a dispersed phase liquid material containing ferromagnetic particles to a counter-current flow of a continuous phase;

applying a high intensity pulsed electric field to the initial droplets so as to shatter the initial droplets into a ferromagnetic emulsion comprising many smaller daughter

droplets in the continuous phase, the daughter droplets having a greater combined total surface area than that of the initial droplets;

applying a magnetic field to the ferromagnetic emulsion to control the position of the ferromagnetic emulsion within the continuous phase;

coalescing a plurality of the daughter droplets into larger reformed droplets; and

separating the reformed droplets from the continuous phase.

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**4,941,960**

## BARREL FOR ELECTROPLATING, PHOSPHATING AND PICKLING

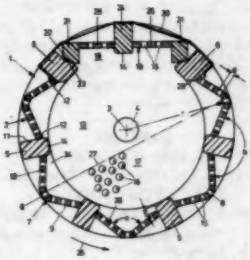
**Hans Henig, Albrecht-Achilles-Strasse 48, D-8500 Nürnberg 60, Fed. Rep. of Germany**

**Filed Dec. 5, 1989, Ser. No. 446,256**

**Claims priority, application Fed. Rep. of Germany, Dec. 12, 1988, 3841789**

**Int. Cl.[5] C25D *17/20***

**U.S. Cl. 204—213** **16 Claims**



1. A rotatable barrel of an electrically non-conductive plastics material for the surface treatment of pourable small pieces (16) in a treatment bath solution (41), comprising:

two end faces (1, 1', 1") spaced apart from each other;

a central longitudinal axis (3);

support bars (5, 6; 5', 6'; 5", 6"; 5*a*; 5*b*) arranged parallel to each other and to said central longitudinal axis (3), which are connected with said end faces (1, 1', 1");

barrel coat sections (7, 7', 7", 7'*a*, 7*b*), which are arranged each between two adjacent support bars (5, 6; 5', 6'; 5", 6"; 5*a*; 5*b*) and which are connected with them, said support bars (5, 6; 5', 6'; 5", 6"; 5*a*; 5*b*) and said barrel coat sections (7, 7', 7", 7'*a*, 7*b*) forming one barrel coat (2, 2', 2") with an inner wall (28);

at least one charge and discharge opening (18, 18") in said barrel coat (2, 2', 2");

at least one cover (19, 19') for closing said at least one charge and discharge opening (18, 18");

an inner room (13, 13') delimited by said end faces (1, 1', 1"), said barrel coat (2, 2', 2") and said at least one cover (19, 19'), and taking up a charge (17) of said small pieces (16);

openings (15) for the passage of said treatment bath solution (41) provided at least in said barrel coat sections (7, 7', 7", 7'*a*, 7*b*); and

rotatable bearing devices (4) arranged adjacent to said end faces (1, 1', 1") and concentrically to said central longitudinal axis (3);

wherein said barrel coat sections (7, 7", 7", 7'*1*, 7*b*) are made roof-shaped by means of two partial sections (9, 10; 9', 10'; 9", 10"; 9*b*, 10*b*) forming a vertex (8, 8', 8*b*) and enclosing a vertex angle (a, a') of more than 90° and less than 180°.

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**4,941,961**

## FLEXIBLE ELASTOMER ELECTRODE

**Toru Noguchi; Toshimichi Takada; Takahiro Yonezaki; Yoshio Yamaguchi, all of Kobe; Hajime Kakiuchi, Itami; Shigehito Deki, Kobe; Kazuo Goto, Kobe; Hitoshi Miyata, Amagasaki, and Satoshi Mashimo, Akashi, all of Japan, assignors to Mitsuboshi Belting Ltd., Nagata, Japan**

**Filed Apr. 21, 1989, Ser. No. 341,708**

**Claims priority, application Japan, Apr. 21, 1988, 63-99960; Jun. 17, 1988, 63-151038; Dec. 13, 1988, 63-315503**

**Int. Cl.[5] C25B *11/12***

**U.S. Cl. 204—294** **32 Claims**

1. A flexible electrode comprising:

an electrically conductive flexible base;

a flexible protective layer having a substantial thickness completely about and enclosing said base, said protective layer formed of an elastomeric material selected from the group of silicone rubbers and fluorine rubbers, said protective layer having electrically conductive material selected from the group consisting of highly conductive carbon black, graphite, and glassy carbon distributed therein, said electrically conductive material being present in the amount of 10 to 30 parts by weight to 100 parts by weight of the elastomeric material, said protective layer being heated and pressurized on said base for a time sufficient to vulcanize said elastomeric material while still resulting in substantial flexibility of said electrode; and

an electrically conductive terminal extending from said base to exteriorly of said protective layer.

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**4,941,962**

## ELECTROSTATIC ADSORPTIVE FLUID FILTERING APPARATUS

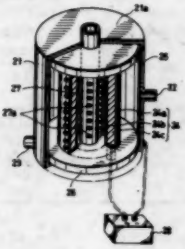
**Noboru Inoue, 2-14-24, Asahicho, Takasagocho, Takasago-shi, Hyogo-ken, Japan, assignor to Noboru Inoue, Takasago, Japan**

**Continuation of Ser. No. 873,040, Jun. 12, 1986, abandoned. This application May 31, 1988, Ser. No. 201,373**

**Claims priority, application Japan, Jun. 17, 1985, 60-131328**

**Int. Cl.[5] B01D *15/00, 35/06*; B03C *3/00***

**U.S. Cl. 204—302** **10 Claims**



1. An electrostatic adsorptive fluid filtering apparatus, comprising:

an outer cylindrical electrode having a fluid inlet;

a charging electrode concentrically inserted in said outer cylindrical electrode, said charging electrode comprising a porous electric conductor formed in a double walled cylinder including concentric inner and outer walls defin-

ing a space therebetween and a hollow interior inside said inner wall, said outer cylindrical electrode and said charging electrode defining together a fluid receiving space communicating with said fluid inlet;

an adsorbent situated in an filling said space between the inner and outer walls of the double walled cylinder;

a central electrode axially extending within said hollow interior of said charging electrode, said central electrode comprising a pipe piece and defining a fluid outlet; and

a source of electrical voltage connected to said outer cylindrical electrode, the charging electrode and the central electrode, wherein a voltage is impressed across said outer cylindrical electrode and said charging electrode, on one side, with the voltage on said central electrode and said outer cylindrical electrode being at the same potential and different from the potential on said charging electrode, while fluid under pressure is introduced through said inlet into said fluid receiving space, and passes through the charging electrode, the adsorbent and the central electrode to said fluid outlet.

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**4,941,963**

**SYNTHESIS OF CRYSTALLINE ZSM-11 STRUCTURE**

**Ernest W. Valyocsik, Yardley, Pa., assignor to Mobil Oil Corp., New York, N.Y.**

**Filed Aug. 30, 1989, Ser. No. 400,412**

**Int. Cl.[5] C10G *1/00*; C01B *33/28***

**U.S. Cl. 208—46** **20 Claims**

1. A method for synthesizing a crystalline material exhibiting a characteristic X-ray diffraction pattern including values as shown in Table 1

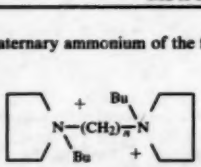
TABLE 1

| Interplanar d-Spacing, (A) | Relative Intensity ($I/I_o$) |
|---|---|
| 11.2 ± .2 | m |
| 10.1 ± .2 | m |
| 6.73 ± .2 | w |
| 5.75 ± .1 | w |
| 5.61 ± .1 | w |
| 5.03 ± .1 | w |
| 4.62 ± .1 | w |
| 4.39 ± .08 | w |
| 3.86 ± .07 | vs |
| 3.86 ± .07 | m |
| 3.49 ± .07 | w |
| (3.07, 3.00 ± .05) | w |
| 2.01 ± .02 | w |

where vs=very strong (75–100), m=medium (25–49), and w=weak (0–24), which comprises (i) preparing a mixture capable of forming said material, said mixture comprising sources of alkali or alkaline earth metal (M), an oxide of trivalent element (X), an oxide of tetravalent element (Y), water and a directing agent (R), and having a composition, in terms of mole ratios, within the following ranges:

| | |
|---|---|
| $YO_2/X_2O_3$ | at least 20 |
| $H_2O/YO_2$ | 5 to 200 |
| $OH^-/YO_2$ | 0.01 to 2.0 |
| $M/YO_2$ | 0.01 to 3.0 |
| $R/YO_2$ | 0.02 to 2.0 |

wherein R is a diquaternary ammonium of the formula:




and wherein Bu is -butyl and n is 6 or 7; (ii) maintaining said mixture under sufficient conditions until crystals of said material are formed; and (iii) recovering said crystalline material from step (ii), said recovered crystalline material containing said R.

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**4,941,964**

**HYDROTREATMENT PROCESS EMPLOYING CATALYST WITH SPECIFIED PORE SIZE DISTRIBUTION**

**Pei-Shing E. Dai; David E. Sherwood, Jr.; Burton H. Bartley, all of Port Arthur, and Randall H. Petty, Winnie, all of Tex., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Mar. 14, 1988, Ser. No. 168,095**

**Int. Cl.[5] C10G *17/00, 45/00***

**U.S. Cl. 208—216 PP** **18 Claims**

1. A process for the hydrotreatment of a sulfur and metal-containing hydrocarbon feed which comprises contacting said feed with hydrogen and a catalyst in a manner such that the catalyst is maintained at isothermal conditions and is exposed to a uniform quality of feed, where said catalyst has a composition comprising 3.0–5.0 wt. % of an oxide of a Group VIII metal, 14.5–24.0 wt. % of an oxide of a Group VIB metal and 0–2.0 wt. % of an oxide of phosphorus supported on a porous alumina support, and said catalyst is further characterized by having a total surface area of 150–210 $m^2/g$ and a total pore volume of 0.50–0.75 cc/g with a pore diameter distribution such that micropores having diameters of 100–160A constitute 70–85% of the total pore volume of said catalyst and macropores having diameters of greater than 250A constitute 5.5–22.0% of the total pore volume of said catalyst.

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**4,941,965**

**PROCESS FOR THE HYDROCRACKING OF A HYDROCARBON FEEDSTOCK AND HYDROCRACKING PLANT FOR CARRYING**

**Jacques Amouroux, Bures s/Yvette, and Mehrdad Nikravech, Paris, both of France, assignors to Electricite de France (Service National), Paris, France**

**Filed May 24, 1988, Ser. No. 197,836**

**Claims priority, application France, May 22, 1987, 87 07216**

**Int. Cl.[5] C10G *47/00***

**U.S. Cl. 208—108** **12 Claims**

1. A process for the hydrocracking of a feedstock of high-molecular hydrocarbons, which comprises mixing a plasma containing hydrogen at a first temperature into a bed of solid particles fluidized by a stream of gas at a second lower temperature in order to produce radical hydrogen entrained in the stream of gas at a temperature below that of the plasma, and reacting radical hydrogen with the said feedstock of high-molecular hydrocarbons to form, under hydrocracking conditions, low-molecular hydrocarbons entrained in the stream of gas.

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**4,941,966**

**PROCESS FOR THE HYDROGENATIVE CONVERSION OF HEAVY OILS AND RESIDUAL OILS**

**Ludwig Merz, Recklinghausen, and Klaus Niemann, Oberhausen, both of Fed. Rep. of Germany, assignors to Veba Oel Entwicklungs-Gesellschaft mbH, Gelsenkirchen, Fed. Rep. of Germany**

**Filed Mar. 23, 1988, Ser. No. 172,225**

**Claims priority, application Fed. Rep. of Germany, Mar. 30, 1987, 3710021**

**The portion of the term of this patent subsequent to Jul. 25, 2006, has been disclaimed.**

**Int. Cl.[5] C10G *49/02***

**U.S. Cl. 208—112** **18 Claims**

1. A process for the hydrogenative conversion of mixtures of oil and organic waste products, comprising the steps of:

(i) preparing a hydrogenation mixture comprising

(a) a heavy oil,

(b) a used oil or a waste oil, and

(c) one or more organic waste products different than (b)

containing natural or synthetic organic compounds comprising uncrossiinked or crosslinked carbon chains;

(ii) contacting said hydrogenation mixture with 0.1–10 wt. % based on said hydrogenation mixture of an additive selected from the group consisting of carbon, red mud, iron oxides, electrostatic filter dusts and cyclone dusts, wherein said additive comprises a mixture of particles in two different particle size ranges, a fine particle fraction with a particle size 90 microns or less, and a coarse particle fraction with a particle size between 100–1000 microns, said mixture of fractions having a correlation coefficient $R^2$ less than 0.96 as determined from the equation:

$$R^2 = \frac{[n\Sigma xy - (\Sigma x)(\Sigma y)]^2}{[n\Sigma x^2 - (\Sigma x)^2][n\Sigma y^2 - (\Sigma y)^2]}$$

wherein n is the number of experimental points, y is ln [− ln (η/100)], x is ln (dp), dp is particle size in microns, and % η is the accumulative weight under a dp in wt. %; and

(iii) hydrogenating said contacted mixture at a hydrogen partial pressure of 50–350 bar, a temperature of 250°–500° C. and a gas/oil ratio of 100–10,000 $m^3/t$ of said hydrogenation mixture calculated at standard temperature and pressure wherein the weight ratio (a)/(b), (a)/(c), or (a) to (b)+(c) is in the range of 100:1 to 1:15.

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**4,941,967**

## PROCESS FOR RE-REFINING SPENT LUBEOILS

**Leonardus M. M. Mannetje, Permata Hijau, Indonesia, and Ashok S. Laghate, Zoetermeer, Netherlands, assignors to Kinetics Technology International B.V., Zoetermeer, Netherlands**

**Continuation of Ser. No. 674,315, Nov. 20, 1984, abandoned. This application Jan. 27, 1987, Ser. No. 9,085**

**Claims priority, application Netherlands, Nov. 23, 1983, 8304023**

**Int. Cl.[5] C10M *11/00***

**U.S. Cl. 208—184** **11 Claims**

1. A process for re-refining spent lubeoils, comprising

(a) removing water and sludge forming impurities from lubeoil,

(b) subjecting the lubeoil to a pre-distillation at reduced pressure and with a short residence time of the oil in the distillation column,

(c) subsequently subjecting it to film evaporation under vacuum, the liquid film being maintained in turbulent motion by wiping,

(d) subjecting the overhead product obtained with the film evaporation to an after-treatment after condensation, wherein the film evaporation takes place in one or more wiped-film evaporators and a portion of the total heavy bottom product of at least one film evaporator is recirculated to the entrance of the film evaporator.

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**4,941,968**

## METHOD FOR INHIBITING GUM FORMATION IN LIQUID HYDROCARBON MEDIUMS

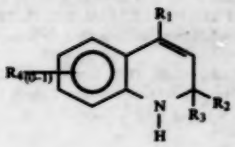
**Dwight K. Reid, Houston, Tex., assignor to Betz Laboratories, Inc., Trevose, Pa.**

**Filed Jul. 28, 1989, Ser. No. 387,329**

**Int. Cl.[5] C10G *29/20***

**U.S. Cl. 208—236** **15 Claims**

1. A method of inhibiting the formation of gum and sediment in a liquid hydrocarbonaceous medium comprising adding to said medium an inhibiting amount of an alkyl 1,2-dihdroquinoline or polymerized alkyl 1,2-dihydroquinoline, said alkyl 1, 2-dihydroquinoline having the structure




wherein $R_1$, $R_2$, and $R_3$ are the same or different and are chosen form H and $C_1$–$C_6$ alkyl, $R_4$, when present, is $C_1$–$C_{20}$ alkyl, or $C_1$–$C_{10}$ alkoxy.

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**4,941,969**

## METHOD OF AND AN APPARATUS FOR THE SEPARATION OF PARAMAGNETIC PARTICLES IN THE FINE AND FINEST PARTICLE SIZE RANGES IN A HIGH-INTENSITY MAGNETIC FIELD

**Klaus Schönert, Tannenhöhe 4, 3392 Clausthal-Zellerfeld, and Hans-Michael Fricke, Limburgerhof, both of Fed. Rep. of Germany, assignors to Klaus Schönert, Clausthal-Zellerfeld, Fed. Rep. of Germany**

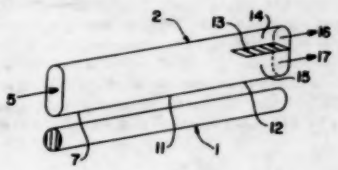
**PCT No. PCT/DE87/00128, § 371 Date Jan. 25, 1988, § 102(e) Date Jan. 25, 1988, PCT Pub. No. WO87/05829, PCT Pub. Date Oct. 8, 1987**

**PCT Filed Mar. 25, 1987, Ser. No. 146,811**

**Claims priority, application Fed. Rep. of Germany, Mar. 26, 1986, 3610303**

**Int. Cl.[5] B03C *1/00***

**U.S. Cl. 209—39** **15 Claims**




1. An apparatus for the continuous separation of a fluid medium entraining paramagnetic particles and non-paramagnetic particles into two product streams, a first product stream containing substantially all of the paramagnetic particles inlet to the apparatus, and the second product stream containing substantially none of the paramagnetic particles inlet to the apparatus, comprising:

a magnetic field generating means for generating a horizontally homogeneous magnetic field,

an induction member located within the homogeneous magnetic field generated by the magnetic field generating means and oriented horizontally at right-angles relative to the magnetic field flux,

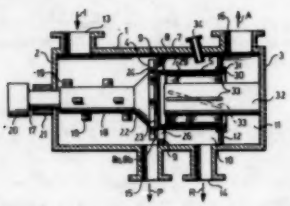
a separating channel associated with and located above said induction member with respect to the direction of the earth's gravitational force and parallel to said induction member, including an inlet end for receiving fluid medium containing entrained paramagnetic particles, and an outlet end having two outlets, a first outlet suitable for withdrawing the first product stream containing substantially all of the paramagnetic particles inlet to the separating channel, and a second outlet suitable for withdrawing the second product stream containing substantially none of the paramagnetic particles inlet to the separating channel.

4,941,970

## APPARATUS FOR DIVIDING A SUSPENSION OF FIBROUS CELLULOSE PULP

Björn Åhs, Karlstad, Sweden, assignor to Kamyr AB, Karlstad, Sweden

Filed Jun. 16, 1988, Ser. No. 207,215
Claims priority, application Sweden, Jul. 3, 1987, 8702745
Int. Cl.[5] B07B *1/00, 1/24*
U.S. Cl. 209—234 17 Claims



1. An apparatus for dividing a suspension of fibrous cellulose pulp into a plurality of portions including an undesired parts portion and a remaining portion, the apparatus comprising a closed housing divided into first and second axially aligned chambers having a common longitudinal axis, each provided with inlet and outlet means; a separating means rotatable at high speed in said first chamber to separate the undesired parts portion from the suspension via the outlet means in said first chamber, the inlet means to the second chamber comprising an opening arranged between said first chamber and said second chamber for transferring the remaining suspension portion which has been substantially freed from undesired parts; a cylindrical screening means in said second chamber, connected to said separating means in said first chamber, the separating means and screening means being driven by a common shaft coincident with said longitudinal axis; and a support means in said second chamber provided with blades with which the screening means cooperates to divide the remaining suspension into different fractions which separately leave said second chamber by said outlet means of said second chamber.

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4,941,971

## APPARATUS FOR MOUNTING IN AN AQUEOUS SYSTEM, A CARTRIDGE FILTER FOR FILTERING THE SYSTEM AND IN PLACE CLEANING THE FILTER

Alva Z. Albright, 1927 Albert St., Alexandria, La. 71301

Continuation-in-part of Ser. No. 764,544, Aug. 12, 1985, abandoned. This application Dec. 2, 1985, Ser. No. 803,291
Int. Cl.[5] B01D *33/06*
U.S. Cl. 210—107 11 Claims

1. Filtering apparatus comprising:
(a) a container;
(b) a filter cartridge mounted in the container;
(c) means for allowing the filter cartridge to rotate relative to the container;
(d) means for causing the filter cartridge to rotate relative to the container, consisting essentially of a nozzle for directing pressurized fluid against the outside of the filter cartridge;
(e) first inlet means communicating with the interior of the container exterior of the filter cartridge for allowing fluid to enter the container exterior of the filter cartridge; and
(f) first outlet means communicating with the interior of the filter cartridge for allowing fluid to exit the container from the interior of the filter cartridge.

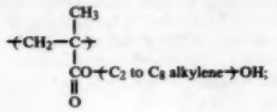
4,941,972

## CHLORINE-STABLE MEMBRANE COMPOSITIONS

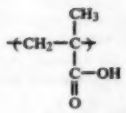
Jee I. Kau, Concord, Calif.; Dale M. Pickelman, Auburn, Mich.; Donald L. Schmidt, and Ritchie A. Wessling, both of Midland, Mich., assignors to The Dow Chemical Company, Midland, Mich.

Filed Dec. 6, 1984, Ser. No. 678,870
Int. Cl.[5] B01D *13/00, 13/01*
U.S. Cl. 210—490 21 Claims

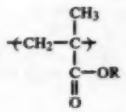
1. A composite membrane comprising a porous substrate and adhering to the substrate at least one selectively permeable film, wherein at least one layer of the film consists essentially of a crosslinked vinyl addition polymer including about 10 to about 80 mole percent of moieties corresponding to formula II, 0 to about 20 mole percent of moieties corresponding to formula III, 0 to about 20 mole percent of moieties corresponding to formula IV, 0 to about 85 mole percent of non-interfering moieties derived from the moieties of formulae II, III or other ethylenically unsaturated moieties and at least one crosslinking group corresponding to formula VI, where formula II is



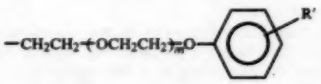
formula III is



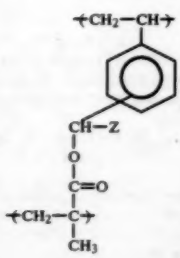
formula IV is



wherein each R is independently $C_1$ to $C_{18}$ alkyl or alkylphenoxypolyethyleneoxyethyl of the formula



wherein m is an integer from 3 to 40 and R' is $C_1$ to $C_{20}$ alkyl; and formula VI is



wherein Z is —H or —$CH_3$.

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4,941,973

## APPARATUS FOR REMOVING IRON OXIDES FROM WATER IN FEED WATER SYSTEM OF A POWER PLANT

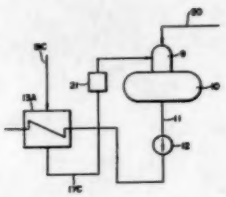
Mamoru Suzuki; Katsumi Suzuki; Kazutoshi Itoh; Akira Minato; Tsuyoshi Kambayashi, and Yoshiyuki Hoshino, all of Hitachi, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 488,429, Apr. 22, 1983, abandoned, which is a continuation of Ser. No. 276,840, Jun. 24, 1981, abandoned. This application Jun. 29, 1988, Ser. No. 213,142

Claims priority, application Japan, Jun. 25, 1980, 55-85137; Jul. 18, 1980, 55-97535

Int. Cl.[5] B01D *21/00*

U.S. Cl. 210—175 19 Claims



18. An apparatus for removing iron oxides from water of a feed water and condensed water system of an electric power plant, which comprises:

a boiler for generating steam;

a turbine connected to the boiler and actuated by the steam;

a condenser for condensing the steam operatively associated with the turbine;

a hot well for storing the condensed water;

means for desalting the condensed water received from said hot well;

a low pressure feed water heater for heating the condensed water obtained from said desalting means;

an air separator for separating air from the condensed water;

an air separator water tank for storing the condensed water taken from said air separator;

a high pressure feed water heater for heating the condensed water obtained from said air separator water tank;

a drain pipe line for feeding drain from said high pressure feed water heater into said air separator; and

means for connecting said boiler, said turbine, said condenser, said hot well, said desalting means, said low pressure feed water heater, said air separator, said air separator water tank and said high pressure feed water heater in fluid communication;

wherein a plurality of permanent magnet blocks are placed in said water tank of said air separator in such a manner that iron oxides contained in the form of magnetite in said condensed water flowing through said water tank of said air separator is magnetically trapped by said permanent magnet blocks.

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4,941,974

## METHOD OF MAKING LIQUID CHROMATOGRAPHY DUAL ZONE PACKING MATERIALS

Dwight E. Williams, Midland, Mich., assignor to Dow Corning Corporation, Midland, Mich.

Division of Ser. No. 212,100, Jun. 27, 1988, Pat. No. 4,855,054, which is a division of Ser. No. 63,147, Jun. 17, 1987, Pat. No. 4,773,994. This application Apr. 10, 1989, Ser. No. 335,885

Int. Cl.[5] B01D *15/08*

U.S. Cl. 210—198.2 13 Claims

1. A method for making a dual zone reverse phase packing material for liquid chromatographic columns which comprises:

(a) providing a hydroxyl-bearing porous support selected from the group consisting of porous metalloid oxides, porous metallic oxides and porous mixed metallic oxides,

(b) contacting said porous support with less than a saturating amount of fluorocarbon silane which is capable of rapidly reacting with and covalently bonding to the hydroxyl groups on the external surface of said porous support under conditions sufficient to form a lipophobic phase comprising fluorocarbon groups in the external zone of said porous support wherein said fluorocarbon groups have the formula:

$$Me_{3-m}SiC_2H_4C_nF_{2n+1}$$

wherein m is 1–3 and n is 1 or more.

(c) thereafter, contacting said porous support with less than a saturating amount a lipophilic silane which is capable of diffusing into the interior of said porous support and covalently bonding to the hydroxyl groups on the internal surface of said porous support under conditions sufficient to form a lipophilic partitioning phase in the internal zone of said porous support, and

(d) thereafter, contacting said porous support with a ketal silane under conditions sufficient to form ketal blocked diol groups on the external surface.

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4,941,975

## STAR-SHAPED FILTER NOZZLE

Hermann Schewe, Hiddenhausen, Fed. Rep. of Germany, assignor to Kleemeier, Schewe & Co. KSH GmbH, Herford, Fed. Rep. of Germany

Filed Apr. 14, 1989, Ser. No. 337,817

Claims priority, application Fed. Rep. of Germany, Apr. 26, 1988, 8805521[U]

Int. Cl.[5] B01D *27/08*

U.S. Cl. 210—232 4 Claims

1. A star-shaped filter nozzle comprising a central, tubular element having a plurality of lateral openings and a plurality of filter nozzle arms radially protruding from said openings in said central member, each of said arms having an inner end removably inserted into lateral openings of said central member, wherein interconnecting elements on said filter nozzle arms and on said central member form complementary parts of a bayonet lock.

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4,941,976

## DEHYDRATION OF GLYCOLS

Craig R. Bartels, and John Reale, Jr., both of Wappingers Falls, N.Y., assignors to Texaco Inc., White Plains, N.Y.

Continuation of Ser. No. 97,766, Sep. 17, 1987, Pat. No. 4,802,988. This application Aug. 23, 1988, Ser. No. 235,082

The portion of the term of this patent subsequent to Feb. 7, 2006, has been disclaimed.

Int. Cl.[5] B01D *69/00*

U.S. Cl. 210—490 5 Claims

1. A non-porous separating layer of thickness of 1–10 microns of cast polyvinyl alcohol of molecular weight $\overline{M}_n$ of 20,000–200,000 which has been cross-linked, in the presence of acid catalyst, with an aliphatic polyaldehyde containing at least three carbon atoms including those in said aldehyde groups, the mole ratio of aldehyde to vinyl alcohol being 0.05–0.30, and thereafter cured at 100°–200° C.

4,941,977

## CROSS-FLOW SEPARATOR FOR SEPARATING COMPONENT SUSPENDED IN A LIQUID

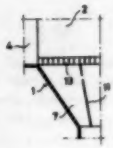
Jan Cornelissen, Den Haag, Netherlands, assignor to Pielkenrood Vinitex B.V., Assendelft, Netherlands

Filed Jan. 5, 1987, Ser. No. 538

Claims priority, application Netherlands, Jan. 9, 1986, 8600032

Int. Cl.[5] B01D *21/10*

U.S. Cl. 210—521 4 Claims



1. In a cross flow plate separator of the type having an assembly of parallel plates inclined to the horizontal plane in a container between a supply chamber and a discharge chamber, and at least one collecting chamber above or below said assembly for collecting components separated from liquid flowing between said plates from said supply to said discharge chambers, and wherein a plurality of dividing baffles transverse to said flow extend in said at least one collecting chambers to a depth below a sediment layer collected beneath said assembly or into a floating layer in a collecting chamber above said assembly, the improvement comprising:

said plates having supply side edges curled (18) for smoothing said liquid flow entering between said plates from said supply chamber.

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4,941,978

## CONTROLLING AND RECOVERING OIL SPILLS FROM THE ENVIRONMENT

Albert Gabrick, 2118 Treeridge Cir., Brea, Calif. 92621

Filed Aug. 7, 1989, Ser. No. 390,170

Int. Cl.[5] C02F *1/28*

U.S. Cl. 210—693 8 Claims

1. The method of preventing oil contamination of an environment by uncontrolled spills of mineral oil and fractions of mineral oil on bodies of water in said environment, which comprises:

a. applying to the spill subdivided particles of an elastomeric gum, consisting essentially of a styrene-ethylene/butylene diblock or triblock copolymer containing from 20 to about 40 percent styrene, in an amount from 0.1 to about 1.5 weight parts per weight part of said oil;

b. permitting said particles to mix with said oil and to absorb said oil thereon and form a low density solid adsorbate, having a non-oily and non-tacky surface, which floats on said body of water; and

c. gathering said solid adsorbate and removing it from said water.

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4,941,979

## METHOD OF STABILIZING MANGANESE IN AQUEOUS SYSTEMS

Stephen M. Kessler, Fairless Hills, Pa., assignor to Betz Laboratories, Inc., Trevose, Pa.

Filed Feb. 8, 1989, Ser. No. 308,172

Int. Cl.[5] C02F *5/10*

U.S. Cl. 210—697 7 Claims

1. A process for stabilizing manganese ions in an aqueous solution comprising adding to said aqueous solution containing manganese ions an effective amount for the purpose of a combination of a polymer consisting essentially of unsaturated carboxylic compounds and an orthophosphate, to maintain said manganese ions soluble in said aqueous solution, wherein the ratio of polymer to orthophosphate is from about 2:1 to about 4:1.

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4,941,980

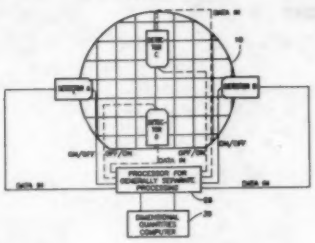
## SYSTEM FOR MEASURING A TOPOGRAPHICAL FEATURE ON A SPECIMEN

Uriel Halavee, Ramat Gan; Israel Niv, Shdema, and Tzila Schwarzkopf, Tel Aviv, all of Israel, assignors to Opal, Inc., Santa Clara, Calif.

Filed Feb. 17, 1989, Ser. No. 312,619

Int. Cl.[5] H01J *37/28*

U.S. Cl. 250—310 12 Claims



1. A system for measuring a topographical feature on a specimen comprising:

means for scanning an electron beam across a topographical feature at high speed;

at least first and scond electron detector means organized in pairs;

means for signal processing of a first signal received from said first electron detector means thereby to identify elements of across-sectional profile of said feature;

means for signal processing of a second signal received from said second electron detector means generally separately from the signal processing of said first signal thereby to identify elements of a cross-sectional profile of said feature;

means for incorporating said elements identified from said first electron detector means and said elements identified from said second electron detector means thereby to produce a composite picture of said feature.

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4,941,981

## MODIFIED NON-POLLUTING LIQUID PHASE SHALE SWELLING INHIBITION DRILLING FLUID

Alphonse C. Perricone; Dennis K. Clapper, and Dorothy P. Enright, all of Houston, Tex., assignors to Baker Hughes Incorporated, Houston, Tex.

Continuation of Ser. No. 128,798, Dec. 4, 1987, Pat. No. 4,830,765. This application Sep. 16, 1988, Ser. No. 245,050

The portion of the term of this patent subsequent to May 16, 2006, has been disclaimed.

Int. Cl.[5] C09K *7/02*

U.S. Cl. 252—8.51 1 Claim

1. A non-polluting modified liquid phase subterranean well drilling fluid consiting essentially of:

(1) a liquid phase containing:

(a) a water soluble phase comprising fresh water, sea water, brine, simulated brine, or mixtures thereof; and

(b) a water-soluble component selected from the class consisting of glycol ethers, polypropylene glycols, tripropylene glycol bottoms having from between about 5% and about 20% by volume tripropylene glycol and from between about 95% and about 80% by volume propylene glycol highers, polyethylene glycols,

ethylene oxide-propylene oxide copolymers, alcohol-initiated ethylene oxide-propylene oxide polymers and-/or mixtures thereof, the ratio of said water-soluble component to the total liquid phase being from between at least about 20% to about 50% by volume;

(2) a viscosifier for suspension of solids in said liquid phase; and

(3) a filtration control agent, the linear swelling on a reconstituted "gumbo" shale inserted in said drilling fluid for about 60 minutes being lower than that for substantially the same fluid without the water soluble component, as measured by the "Swelling Test", "Rig-site Shale Evaluation Techniques for Control of Shale-Related Wellbore Instability Problems", SPE/IADC Paper No. 16054, Pages 52–53 (1987), said drilling fluid being less toxic to mysid shrimp than an 80:20 oil based drilling fluid containing a mineral seal oil as the oil phase following toxicity test procedures as set forth in "Acute Toxicity of Eight Laboratory Prepared Generic Drilling Fluids to Mysids (Mysidopsis Bahia)", 1984 EPA-600/3-84-067.

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**4,941,982**

## CALCIUM-FREE CLEAR HIGH DENSITY FLUIDS

**Ahmad Dadgar, and Charles C. Shin, both of Lafayette, Ind., assignors to Great Lakes Chemical Corporation, West Lafayette, Ind.**

**Continuation-in-part of Ser. No. 938,866, Dec. 8, 1986, abandoned, which is a continuation-in-part of Ser. No. 892,155, Jul. 30, 1986, abandoned. This application Jul. 28, 1988, Ser. No. 225,347**

**The portion of the term of this patent subsequent to Nov. 15, 2005, has been disclaimed.**

**Int. Cl.**[5] **E21B** *43/00*; **C09K** *7/04*

**U.S. Cl. 252—8.551** **7 Claims**

1. A clear, high-density calcium-free fluid adapted for use as well completion, packing and perforating media comprising an aqueous solution of about 44 percent by weight zinc bromide and about 35 up to about 36 percent by weight of at least one member selected from the group consisting of sodium bromide and potassium bromide, the solution having a density of about 19.2 pounds per gallon and a pH lying in the range of about 1.0 to 5.5.

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**4,941,983**

## FLUID LOSS-REDUCING ADDITIVES FOR OIL-BASED WELL WORKING FLUIDS

**Jacqueline A. Coates; John M. Farrar, and Margaret H., all of Graham, Leeds, Great Britain, assignors to Sandoz Ltd., Basel, Switzerland**

**Continuation of Ser. No. 91,243, Aug. 31, 1987, abandoned. This application Aug. 29, 1988, Ser. No. 238,018**

**Claims priority, application United Kingdom, Sep. 1, 1986, 8621086**

**The portion of the term of this patent subsequent to Feb. 26, 2002, has been disclaimed.**

**Int. Cl.**[5] **C09K** *7/06*

**U.S. Cl. 252—8.515** **7 Claims**

1. A fluid loss additive for oil-based well-working fluids, the fluid loss additive comprising:

(i) lignite or humic acid (hereinafter referred to as component i); and

(ii) (a) a compound of Formulae I, II, VIII, XXX, or XXXI, or the salts thereof, and/or

(b) a compound of Formulae XI, XII, XIII, XIV, XV, XVI, XVII or XVIII, and/or

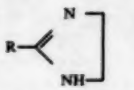
(c) the fully or partially reacted reaction product of a phosphoric acid with a compound of Formulae I, II, III, IV, V, VI, VII, VIII, IX, X, XXX, or XXXI,

said compound or compounds being referred to collectively as component ii;

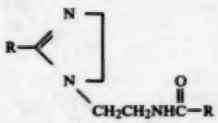
(iii) a dimer and/or trimer fatty acid component (collectively referred to as component iii);

wherein the weight proportion of said components i and ii to component iii is between 10:1 and 1:2,

said compounds of Formulae I–XVIII, and XXX–XXXI having the following significances:

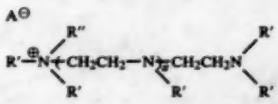


I



II

wherein each R is independently, hydrogen, $C_{1-21}$alkyl or $C_{2-21}$alkenyl;



VIII

wherein a is 0 or an integer from 1 to 6 inclusive, each R' independently, has a significance of R or is $(CH_2CH_2O)_x$—H or $(CH_2—CH(CH_3)—O—)_x$—H;

$A^{\ominus}$ is an anion;

x is an integer from 1 to 10 inclusive;

R" is $—CH_3$ or $C_2H_5$, and

R is as defined above;

IX $RNHCH_2(CH_2)_yCO_2^{\ominus}X^{\oplus}$

X $RN(CH_2(CH_2)_yCO_2^{\ominus})_2X^{\oplus}$

wherein in Formulae IX and X, $X^{\oplus}$ is a cation, and y is 0 or 1;

XXX. the reaction product of:

1 mole of ethylenediamine with 1 mole of $C_{1-22}$alkanoic or $C_{3-22}$alkenoic acid, or

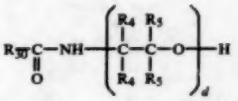
1 mole of diethylene triamine with 1 or 2 moles of $C_{1-22}$alkanoic or $C_{3-22}$alkenoic acid, or

1 mole of triethylene tetraamine with 1 to 3 moles of $C_{1-22}$alkanoic or $C_{3-22}$alkenoic acid, or

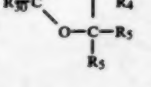
1 mole of tetraethylene pentamine with 1 to 4 moles of $C_{1-22}$alkanoic or $C_{3-22}$alkenoic acid;

XXXI. the reaction product of 1 mole of triethanolamine with 1 to 3 moles of $C_{1-22}$alkanoic or $C_{3-22}$alkenoic acid;

XI $R_{31}$-Z-$R_{31}$



XII



XIII

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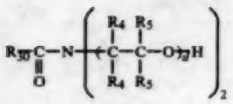
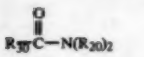
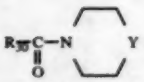


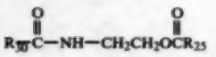
XI



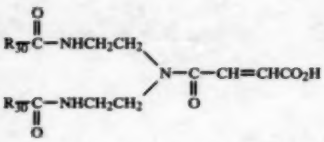
XII



XIII



XIV



XV

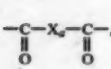
wherein in Formulae XI–XVIII,

each $R_{31}$ independently, is the residue of the reaction product of Formulae III, bound to Z through an amine group;

$R_{30}$ is hydrogen, $C_{1\text{-}21}$alkyl or $C_{2\text{-}21}$alkenyl;

Z is

$C_{1\text{-}4}$alkylene,



or

—CO—

where $X_a$ is direct bond, $C_{2\text{-}12}$alkenylene or $C_{1\text{-}12}$alkylene.

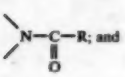
each d, independently, is an integer from 1 to 15 inclusive;

each $R_4$ independently, is hydrogen, $C_{2\text{-}4}$ alkenyl or $C_{1\text{-}4}$hydroxyalkyl;

each $R_5$ independently has one of the significances of $R_4$;

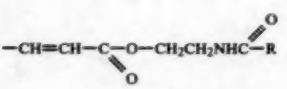
each $R_{20}$ independently has a significance of $R_4$ as defined above or R where R is hydrogen, $C_{1\text{-}21}$alkyl or $C_{2\text{-}21}$alkenyl;

Y is a direct bond, -O- or

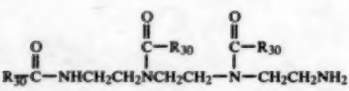


XVI

$R_{25}$ is —CH=CH—COOH or



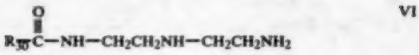
XVII



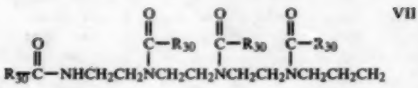
XVIII

-continued

V



VI



VII

wherein each $R_{30}$ is independently, hydrogen, $C_{1\text{-}21}$alkyl or $C_{2\text{-}21}$alkenyl.

7. A process for producing a fluid loss additive for an oil-based well-working fluid comprising the step of mixing together components (i), (ii) and (iii) defined in claim **1**, in an oil or oil based fluid at a temperature not greater than 70° C.

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**4,941,984**

## LUBRICATING OIL COMPOSITIONS AND METHODS FOR LUBRICATING GASOLINE-FUELED AND/OR ALCOHOL-FUELED, SPARK-IGNITED ENGINES

**William B. Chamberlin, III, Kirtland, and Frank V. Zalar, Novelty, both of Ohio, assignors to The Lubrizol Corporation, Wickliffe, Ohio**

**Filed Jul. 31, 1989, Ser. No. 387,719**
**Int. Cl.**[5] **C10M** *105/22*
**U.S. Cl. 252—39** **52 Claims**

1. A lubricating oil composition for gasoline fueled or alcohol fueled spark-ignited engines or both, which comprises:

(A) an oil of lubricating viscosity;

(B) at least one detergent selected from the group consisting of a basic magnesium salt of an organic acid, and a mixture of at least one basic magnesium salt of an organic acid and another alkaline earth metal salt of an organic acid wherein more than 50% of the metal in the mixture is magnesium; and

(C) at least one metal salt of

(C-1) a substituted succinic acid acylated polyamine; or

(C-2) a hydrocarbon-substituted aromatic carboxylic acid containing at least one hydroxyl group attached to an aromatic ring, provided that the metal of said metal salt (C) is not calcium or magnesium.

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**4,941,985**

## DISPERSANT/ANTIOXIDANT VII LUBRICANT ADDITIVE

**Nicholas Benfaremo, Wappingers Falls; Maria M. Kapuscinski, Carmel, and Theodore E. Nalesnik, Wappingers Falls, all of N.Y., assignors to Texaco Inc., White Plains, N.Y.**

**Filed Dec. 1, 1989, Ser. No. 444,224**
**Int. Cl.**[5] **C10M** *145/14*
**U.S. Cl. 252—51.5 R** **19 Claims**

1. A dispersant/antioxidant bound, Viscosity Indeximproving polymethacrylate composition, having a molecular weight ranging from about 20,000 to about 2,500,000, said compositions comprising a base oil and effective amounts of alkyl, methacrylate monomers, a polyunsaturated monomer, an aro-

matic nitroso compound and, optionally, a dispersant monomer, said composition being prepared by:

(a) combining a polyunsaturated monomer with ($C_1$–$C_{20}$) alkyl monomers and (optional) a dispersant monomer, in an oil solvent to provide an intermediate reaction mixture;
(b) stirring and purging said reaction mixture by nitrogen ebullition at about 200 ml/min. for about 25 to about 35 minutes;
(c) reducing the nitrogen ebullition to about 20 ml/min.;
(d) heating the purged mixture to about 70° C. to about 85° C. and adding a radical polymerization catalyst to the purged mixture;
(e) increasing the temperature of said heated mixture to about 95° -105° C. and maintaining said mixture at such temperature for a sufficient period of time to remove any excess of said polymerization catalyst; and
(f) (optional) recovering the intermediate product polymethacrylate;
(g) combining said intermediate product polymethacrylate with an aromatic nitroso compound to provide an intermediate reaction mixture;
(h) stirring said intermediate reaction mixture while purging with nitrogen at a rate of 20 ml/min for about 20 to about 25 min.;
(i) heating said reaction mixture to about 120° C. and maintaining said temperature for about 30 min.;
(j) increasing the temperatue of the reaction mixture to about 160° C while collecting water over about 1.0 hour; and
(k) recovering the product polymethacrylate.

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**4,941,986**

## LIQUID COMPOSITIONS CONTAINING ORGANIC NITRO COMPOUNDS

**Scott T. Jolly, Mentor, Ohio, assignor to The Lubrizol Corporation, Wickliffe, Ohio**

**Filed Mar. 16, 1989, Ser. No. 324,587**
**Int. Cl.[5] C10M** *105/52, 133/32*
**U.S. Cl. 252—51.5 R** **24 Claims**

1. A liquid composition comprising

(A) a major amount of at least one fluorine containing hydrocarbon containing one or two carbon atoms; and
(B) a minor amount of a soluble organic lubricant comprising at least one organic nitro compound characterized by the formulae

$$R_xN(H)_{3-x}[CH_2C(R^1)(R^2)NO_2]_y \quad (I)$$

and

$$CH_2[N(R)CH_2C(R^1)(R^2)NO_2]_2 \quad (II)$$

wherein

R is a hydrocarbyl group, a polyaminoalkyl group, or $R^4XR^5$— wherein $R^4$ is H, hydrocarbyl, hydroxyalkyl or aminoalkyl, X is 0 or $NR^6$, wherein $R^6$ is H or a nitroalkyl group, and $R^5$ is an alkylene group, or $R^4X$ is a morpholinyl group attached to $R^5$ through the nitrogen atom; and
$R^1$ and $R^2$ are each independently H or lower aliphatic groups;
x is 0 or 1;
y is 1 or 2; and
z is 1 or 2, provided that the sum of x, y and z is 3.

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**4,941,987**

## LUBRICATING GREASES

**Ezio Strepparola, Treviglio; Mario Alfieri, and Piero Gavezotti, both of Milan, all of Italy, assignors to Ausimont S.p.A., Milan, Italy**

**Filed Dec. 30, 1988, Ser. No. 292,010**
**Claims priority, application Italy, Dec. 30, 1987, 23264 A/87**
**Int. Cl.[5] C10M** *105/50*
**U.S. Cl. 252—58** **18 Claims**

1. A lubricating grease comprising a thickening agent and a perfluoropolyether or fluoropolyether derivative of the formula R—O—Q—CFX—$(Y)_n$—Z, having a number average molecular weight ranging from 1,500 to 10,000, in which:

R is a perfluoroalkyl radical containing 1 to 3 carbon atoms or it is the group Z—$(Y)_n$—CFX;
Q is a perfluoroalkylpolyether or fluoroalkylpolyether chain;
X is F or $CF_3$;
Y is a linking divalent radical;
n is zero or 1;
Z is a radical selected from the group consisting of —$CH_2OH$, —$CH_2OR^1$, —$COOR^2$, —$CONR^3R^4$, —CN, —$CH_2NH_2$, —$CH_2NHR^5$, —$CH_2NR^6R^7$, —CHOH—$CH_2OH$ and —$COR^8$,

wherein

$R^1$, $R^2$, $R^3$, $R^4$, $R^5$, $R^6$, $R^7$ and $R^8$, alike or different from one another, are an alkyl group containing 1 to 8 carbon atoms, an aromatic group containing 6 or 10 carbon atoms or an alkyl aromatic group containing 7 to 11 carbon atoms and in which the aromatic ring or rings are unsubstituted or substituted with alkyl or polyethoxy substituting groups, or Z is an organic group selected from the group consisting of non-aromatic and non-fluorinated radicals containing two or more heteroatoms, alike or different from one another, selected from the group consisting of O, N, S, Se and P and located in position 1–3, 1–4, or 1–5 to one another;

said aromatic or non-aromatic radicals are unsubstituted or substituted with one or more substituting groups selected from the group consisting of $NO_2$, CN, $R^9$ or $OR^9$, wherein $R^9$ is an alkyl radical containing 1 to 3 carbon atoms.

10. A lubricating grease comprising a thickening agent and a perfluoropolyether or fluoropolyether derivative of the formula R—O—Q—CFX—$(Y)_n$—Z, having a number average molecular weight ranging from 1,500 to 10,000, in which:

R is a perfluoroalkyl radical containing 1 to 3 carbon atoms or it is the group Z—$(Y)_n$—CFX;
Q is a perfluoroalkylpolyether or fluoroalkylpolyether chain;
X is F or $CF_3$;
Y is a linking divalent radical;
n is zero or 1;
Z is an organic group selected from the group consisting of aromatic radicals unsubstituted or substituted by one or more heteroatoms, either alike or different from one another, selected from the group consisting of O, N, S, Se and P, said aromatic radicals are unsubstituted or substituted with one or more substituting groups selected from the group consisting of $NO_2$, CN, $R^9$ or $OR^9$, wherein $R^9$ is an alkyl radical containing 1 to 3 carbon atoms.

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**4,941,988**

## LIQUID AUTOMATIC DISHWASHING COMPOSITIONS HAVING AN OPTIMIZED THICKENING SYSTEM

**Rodney M. Wise, Cincinnati, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio**

**Filed Feb. 13, 1989, Ser. No. 310,812**
**Int. Cl.[5] C11D** *7/16, 7/20, 7/56*
**U.S. Cl. 252—99** **14 Claims**

1. A liquid automatic dishwashing detergent composition having improved rheology comprising:

(a) from 0% to about 5% of a detergent surfactant;
(b) from about 5% to about 40% of a detergency builder material;
(c) a chlorine bleach ingredient to provide from 0% to about 2.5% of available chlorine based on the weight of the detergent composition;
(d) from about 0.25% to about 10.0% of a polycarboxylate polymer thickening agent having a molecular weight greater than about 500,000; and
(e) from about 2% to about 15%, on a solids basis, of an alkali metal silico-aluminate colloidal dispersion, wherein

the molar ratio of aluminum metal to $SiO_2$ is from about 0.01:1 to about 0.1:1;

said composition having an apparent yield value of from about 40 to about 800 dynes/$cm^2$.

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**4,941,989**

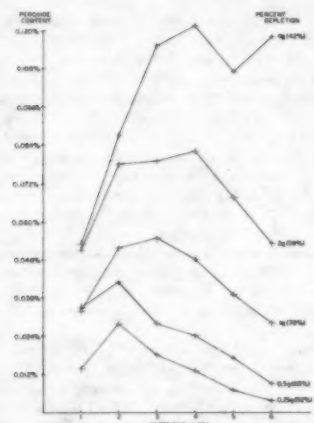
**CLEANSING AND DISINFECTING COMPOSITIONS**

**David N. Kramer, Stevenson, and Philip A. Snow, Henderson, both of Md., assignors to Ridgely Products co., Inc., Baltimore, Md.**

**Filed Jul. 16, 1986, Ser. No. 886,171**

**Int. Cl.[5] A02D *5/00***

**U.S. Cl. 252—102** **34 Claims**



**1.** A cleansing and disinfecting composition comprising from about 10% to about 90% by weight of an alkaline water-soluble salt having hydrogen peroxide of crystallization and from about a fraction of a percent to about 30% by weight of a positively charged phase-transfer agent, including either a phosphonium salt, a sulfonium salt, or a quaternary ammonium salt having a chain of carbon atoms on the quaternary nitrogen approximately 6 to 30 atoms in length.

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**4,941,990**

**SKIN CLEANSING-CREAM CONDITIONING BAR**

**James H. McLaughlin, 7 Widgeon La., Little Compton, R.I. 02837**

**PCT No. PCT/US89/00788, § 371 Date Apr. 7, 1989, § 102(e) Date Apr. 7, 1989, PCT Pub. No. WO89/08444, PCT Pub. Date Sep. 21, 1989**

**Continuation-in-part of Ser. No. 166,330, Mar. 10, 1988, Pat. No. 4,808,322. This PCT application Feb. 22, 1989, Ser. No. 424,301**

**Int. Cl.[5] A61K *7/48, 7/50*; C11D *9/48, 10/04***

**U.S. Cl. 252—121** **27 Claims**

**1.** A non-foaming, skin cleansing-conditioning bar consisting essentially of about 8% to 38% by weight of an anionic surfactant material selected from the group consisting of a sodium or potassium salt of a C-12–C-18 saturated monocarboxylic acid, a water-soluble, non-soap, anionic detergent selected from the group consisting of sodium and potassium salts of C-8–C-18 acyl isethionates, C-8–C-18 alkyl sulfates, C-10–C-20 alkyl sulfonates, C-8–C-18 alkyl monoglyceride sulfates, C-8–C-16 alkylbenzene sulfonates and C-8–C-18 alkyl polyethenoxy ether sulfates containing one to twelve ethenoxy groups in the molecule and mixtures thereof and mixtures of said monocarboxylic acid salt and said non-soap detergent in a weight ratio of said monocarboxylic acid salt to said detergent of 18:1 to about 2.5:1; about 12% to 72% by weight of a water-insoluble emollient selected from the group consisting of a C-14–C-18 alkanol and mixtures of said alkanol with a C-14–C-18 alkanoic acid wherein the weight ratio of said ankanol to said alkanoic acid is in the range of about 23:1 to about 0.6:1; the weight ratio of said emollient material to said surfanctant material being from about 10:1 to about 1.3:1; 0% to 60% of a starch-derived filler; and 2% to 12% by weight of water; said bar having a pH in the range of 6 to 9.5 measured as a 1% by weight aqueous solution and yielding a satisfactory volume of a non-foaming, cleansing-conditioning cream of moderate viscosity when the wetted bar is rotated and manipulated between the wetted hands of the user.

**24.** A method of cleansing and conditioning the skin comprising the steps of (a) forming a non-foaming, cleansing-conditioning cream by rotating and manipulating a wetted bar between the wetted hands of the user, said bar having the composition set forth in claim 1; (b) applying the cleansing-conditioning cream of step (a) to the skin to be cleansed and conditioned; (c) massaging said cream into the skin with the user's hands and fingers; and (d) rinsing the cream-treated skin with water.

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**4,941,991**

**COMPOSITION AND PROCESS FOR USE IN NEUTRALIZING MALODOROUS GASES**

**A. H. J. Rajamannan, 2120 Argonne Dr., N.E., Minneapolis, Minn. 55421**

**Filed Oct. 22, 1987, Ser. No. 111,414**

**Int. Cl.[5] C09K *3/00***

**U.S. Cl. 252—189** **2 Claims**

**1.** A composition for neutralizing malodorous gases in the air, comprising:

a gas neutralizing agent selected from the group consisting of unsubstituted polyethyleneimine having a molecular weight of from about 300 to about 100,000 and substituted polyethyleneimines modified through substitution of hydroxyalkyl, hydroxychloroalkyl, epoxyyalkyl, hydroxy sulfoalkyl, phenylalkyl, cyanoalkyl, and carbamyl groups on at least one of said imine groups of the polyethyleneimine,

a solvent including water and lower alkanols selected from the group consisting of ethanol, methanol, and isopropanol,

said neutralizing agent comprising 20% to 40% by weight, said water comprising approximately 56% to 58% by weight, and said lower alkanol comprising approximately 2% by weight of said composition,

a cross-linking agent for cross-linking polyethyleneimine with the molecules of malodorous gas selected from the group consisting of ammonium dichromate, glycerol epoxy resins, and polycycloaliphatic polyepoxides, the amount of cross-linking agent comprising about 0.001 part to 2 parts based on the total weight of the unsubstituted or substituted polyethyleneimine, and

said composition being diluted between 1:10 and 1:200 parts water and applied as a spray or mist, into the air containing malodorous gases.

4,941,992

## N-SUBSTITUTED AMINO ACID DERIVATIVES FOR USE IN LIQUID CRYSTAL MATERIALS AND DEVICES

Adam Jackson; Richard M. Scrowston; George W. Gray; David Lacey, and Kenneth J. Toyne, all of North Humberside, England, assignors to The Secretary of State for Defence in Her Britannic Majesty's Government of the United Kingdom of Great Britain and Northern Ireland, London, England

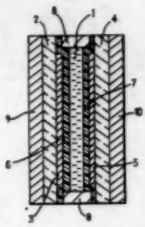
PCT No. PCT/GB86/00599, § 371 Date Jul. 17, 1987, § 102(e) Date Jul. 17, 1987, PCT Pub. No. WO87/02375, PCT Pub. Date Apr. 23, 1987

PCT Filed Oct. 6, 1986, Ser. No. 93,546

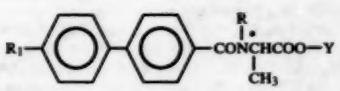
Claims priority, application United Kingdom, Oct. 9, 1985, 8524879

Int. Cl.[5] C09K *19/12*

U.S. Cl. 252—299.66 6 Claims



1. An optically active derivative of an alpha-aminocarboxylic acid having the formula I:



I

where $R_1$ is selected from the group consisting of $C_{1-20}$ alkyl or alkoxy, R is $C_{1-20}$ n-alkyl and Y is $C_{1-20}$ alkyl.

4,941,993

## PROCESS FOR THE PRODUCTION OF CONDENSATION PRODUCTS WHICH CAN BE CONVERTED INTO GLASS

Peter Strehlow, Würzburg, and Helmut Schmidt, Zellingen, both of Fed. Rep. of Germany, assignors to Fraunhofer-Gesellschaft zur Förderung der angewandten Forschung e.V., München, Fed. Rep. of Germany

Filed Mar. 30, 1989, Ser. No. 330,493

Claims priority, application Fed. Rep. of Germany, Mar. 31, 1988, 3811185

Int. Cl.[5] C09K *3/36*

U.S. Cl. 252—315.6 18 Claims

1. A process for the production of substantially homogeneous condensation products, which are capable of being converted to glass by hydrolytic condensation of compounds of elements whose presence in the glass end product is desired, which comprises bringing a solution containing:

(a) at least one compound of the formula (I):

$$SiR_4 \quad (I)$$

in which radicals R are identical to or different from each other, and each R is a hydrolyzable group or hydroxyl group, or an oligomer derived therefrom or a combination thereof;

(b) at least one compound of the formula (II) or (III):

$$MR'_3 \quad (II)$$

$$TiR'_4 \quad (III)$$

in which M represents Al or B; and the radicals R', which are identical to or different from each other, are each a hydrolyzable group or hydroxyl group or a hydrolyzable aluminum salt or an oligomer derived from said compounds, or a combination thereof; and

(c) at least one hydrolyzable compound or at least one hydroxide, oxide or oxide hydrate of an element selected from the group consisting of lithium, sodium, potassium, rubidium, cesium, beryllium, magnesium, calcium, strontium and barium; into contact with at least an element of water stoichiometrically necessary for complete hydrolysis of said hydrolyzable groups present, in the presence of a complexing agent selected from the group consisting of β-carbonyl carboxylic esters, and $C_2$–$C_5$ carboxylic acids and their carboxylate ions, whereby the hydrolysis of said hydrolyzable compounds is effected substantially without loss of less reactive volatile starting compounds, and substantially without formation of precipitates from more reactive starting compounds during hydrolysis.

4,941,994

## CORROSION INHIBITORS FOR USE IN HOT HYDROCARBONS

Michael J. Zetlmeisl, and Benjamin T. Outlaw, both of St. Louis, Mo., assignors to Petrolite Corporation, St. Louis, Mo.

Filed Jul. 18, 1989, Ser. No. 381,549

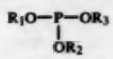
Int. Cl.[5] C23F *11/10*

U.S. Cl. 252—389.23 5 Claims

1. A process of inhibiting nonaqueous corrosion of iron-containing metal surfaces in crude oil refining and cracking apparatus in a crude oil containing a corrosive amount of napthenic acid undergoing refining and cracking comprising maintaining an effective corrosion inhibiting amount of a dialkyl phosphite or a trialkyl phosphite having the structural formula:

(I)

or



(II)

wherein $R_1$, $R_2$, and $R_3$ are each independently a straight or branched chain lower alkyl radical having 1 to 10 carbon atoms.

4,941,995

## NATURAL PRESERVATIVE COMPOSITION FOR WET WIPES

Marc F. Richards, Dover, Del., assignor to Scott Paper Company, Philadelphia, Pa.

Filed Jul. 5, 1988, Ser. No. 215,196

Int. Cl.[5] A61F *13/15*

U.S. Cl. 252—407 11 Claims

1. A preservative composition for an aqueous lotion-impregnated fibrous wipe, comprising at least two carboxylic acids and grapefruit seed extract in an amount between 0.001 and and 1.0% by weight of the aqueous lotion, the pH of said aqueous lotion being adjusted to keep said carboxylic acids undisassociated.

## 4,941,996
## INCLUSION COMPLEXES PROVIDING SECOND HARMONIC GENERATION

John E. Trend, St. Paul, Minn., and Kent B. Rochford, Tucson, Ariz., assignors to Minnesota Mining and Manufacturing Company, St. Paul, Minn.

Filed Oct. 19, 1987, Ser. No. 89,219
Int. Cl.[5] G02B 5/20
U.S. Cl. 252—584 9 Claims

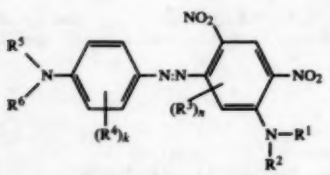
1. A process for converting a fixed fundamental frequency of coherent laser light into a second harmonic frequency which comprises passing said laser light through a nonlinear optical element comprising a non-centrosymmetric host material, selected from the group consisting of cyclodextrins, cyclodextrin polymers, and amyloses, and guest material, selected from the group consisting of 5-nitroindoline, 4-nitrophenol, the sodium salt of methyl orange, and carbon disulfide, entrapped within the molecular structure of said host material or entrapped between two or more adjacent molecules of said host materials, said complex having a non-zero second order molecular hyperpolarizability, said complex further exhibiting greater second harmonic generation efficiency than either said host material or said guest material exhibits alone, said complex being transparent to said fixed fundamental frequency and to said second harmonic frequency.

## 4,941,997
## AMPHIPHILIC AZO DYES AND MOLECULAR AGGREGATES THEREOF

Gero Decher, Walluf, Fed. Rep. of Germany, and Bernd Tieke, Marly, Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.

Filed Jul. 6, 1988, Ser. No. 215,672
Claims priority, application Switzerland, Jul. 13, 1987, 2656/87
Int. Cl.[5] C02B 27/28; C09B 29/085; C07C 245/08
U.S. Cl. 252—586 2 Claims

1. A molecular aggregate of a compound of the formula

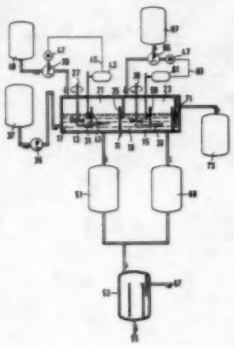


wherein $R^1$ is $C_{12}$–$C_{30}$alkyl, $R^2$ is hydrogen or $C_1$–$C_{30}$alkyl, $R^3$ is $C_1$–$C_3$alkyl or $C_1$–$C_3$alkoxy, $R^4$ has one of the meanings of $R^3$ or is halogen, k and n are each independently of the other 0, 1 or 2, and $R^5$ and $R^6$ are each independently of the other $C_1$–$C_4$alkyl, wherein the alkyl groups of $R^1$, $R^2$, $R^3$, and $R^4$ have the meanings above or are partly fluorinated or perfluorinated, with the proviso that $R^1$ is alkyl of not less than 18 carbon atoms if $R^2$ is hydrogen or alkyl of less than 12 carbon atoms, wherein said aggregate is assembled in the form of mixed liposomes, microcrystalline films or Langmuir-Blodgett layers.

## 4,941,998
## METHOD OF WASHING A SOLVENT IN THE REPROCESSING OF IRRADIATED NUCLEAR FUELS

Klaus Eiben, Ettlingen, and Heinz Evers, Busenberg, both of Fed. Rep. of Germany, assignors to Deutsche Gesellschaft für Wiederaufarbeitung von Kernbrennstoffen mbH, Hanover, Fed. Rep. of Germany

Filed May 18, 1988, Ser. No. 195,272
Claims priority, application Fed. Rep. of Germany, Jun. 1, 1987, 3718338
Int. Cl.[5] G21C 19/42, 19/44; G21F 9/08; B01D 11/00
U.S. Cl. 252—627 6 Claims



1. Method of washing an organic solvent in the reprocessing of irradiated nuclear fuel with a mixer-settler having two stages wherein two phases are mixed, the first mixer-settler stage including a mixing chamber and a settling chamber and the second mixer-settler stage also including a mixing chamber and a settling chamber, the method comprising the steps of:

metering the solvent to be washed to the mixing chamber of the first stage as one of the phases;

metering a first aqueous washing solution into the first stage at the mixing chamber thereof as the other one of the phases;

measuring the pH of the dispersion of said phases in said mixing chamber of the first stage to obtain a signal indicative of the pH value of the dispersion;

controlling the quantity of the first aqueous washing solution metered to the mixing chamber of the first stage in response to said signal for maintaining said pH-value within a predetermined range;

drawing off the first aqueous washing solution at the bottom of the first stage;

metering a second aqueous washing solution into the second stage at the mixing chamber thereof for neutralizing the solution which has been subjected to washing by said first aqueous washing solution;

drawing off the second aqueous washing solution at the bottom of said second stage; and,

mixing the spent first and second aqueous washing solutions to form a new process product in the form of a mixed solution which again has two phases.

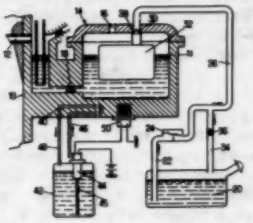
## 4,941,999
## FUEL SUPPLY DEVICE WITH COOLED FLOW CHAMBER

Guy Noisier, Brunoy, France, assignor to Solex, France

Filed Mar. 13, 1989, Ser. No. 322,290
Claims priority, application France, Mar. 23, 1988, 88 03807
Int. Cl.[5] F02M 5/10
U.S. Cl. 261—130 8 Claims

1. Fuel supply device for internal combustion engine, comprising a constant level chamber defined by a casing for loca-

tion in close proximity to the engine, a heat exchanger in thermal contact with said casing, and means for circulating a cooling liquid in a closed-loop circuit including said heat exchanger and a windshield cleaner reservoir having a size sufficient for containing a volume of said cooling liquid which is large as compared with the volume of the balance of the closed-loop circuit.



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**4,942,000**

**CONTACTLESS KNURLING PROCESS FOR WINDING OF HIGH MODULUS THERMOPLASTIC FILMS**

**John A. Penoyer, 106 Sturbridge Dr., Greenville, S.C. 29607**

**Filed Jul. 30, 1986, Ser. No. 891,937**

**Int. Cl.[5] B29C *35/10, 71/04***

**U.S. Cl. 264—22** **12 Claims**

1. A process for improving the winding characteristics of a thermoplastic film comprising modifying the surface of at least one margin of said film on an intermittent basis by means for film surface modification which do not contact the surface of said film web such that the thickness of the film which has been surface-modified is greater than the thickness of the film which has not been surface-modified by an amount effective to improve the winding characteristics of the film.

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**4,942,001**

**METHOD OF FORMING A THREE-DIMENSIONAL OBJECT BY STEREOLITHOGRAPHY AND COMPOSITION THEREFORE**

**Edward J. Murphy, Des Plaines; Robert E. Ansel, Hoffman Estates, and John J. Krajewski, Wheeling, all of Ill., assignors to Inc. DeSoto, Des Plaines, Ill.**

**Continuation-in-part of Ser. No. 162,983, Mar. 2, 1988, abandoned. This application Oct. 31, 1989, Ser. No. 429,568**

**Int. Cl.[5] B29C *35/08*; C08F *4/32, 26/10, 120/18***

**U.S. Cl. 264—22** **20 Claims**

1. An ultraviolet-curable liquid composition adapted to cure rapidly to a lightly cross-linked solvent-swellable three-dimensional complexly-shaped polymeric thin-walled element constituted by heat-softenable solid polymer upon exposure to ultraviolet dosage in the range of about 0.1 to about 10 Joules per square centimeter and which possesses reduced distortion comprising, from 20 to 80 weight percent, of a resinous polyacrylate or polymethacrylate dissolved in a combination of 10 to 40 weight percent of a liquid polyacrylate or polymethacrylate, one of the foregoing being a polyacrylate and the other being a polymethacrylate, and 10 to 30 weight percent of a liquid N-vinyl monomer.

13. A method of forming a three-dimensional thin-walled object comprising, providing a reservoir of liquid ultraviolet-curable ethylenically unsaturated material comprising, from 20 to 80 weight percent, of a resinous polyacrylate or polymethacrylate dissolved in a combination of 10 to 35 weight percent of a liquid polyacrylate or polymethacrylate, one of the foregoing being a polyacrylate and the other being a polymethacrylate, and 10 to 40 weight percent of liquid N-vinyl monomer, exposing the surface of said reservoir to a beam of ultraviolet light to apply a dosage in the range of about 0.1 to about 10 Joules per square centimeter to said surface to solidify the liquid near said surface to form a plurality of superposed layers of lightly cross-linked solvent-swellable three-dimensional complexly-shaped polymeric thin-walled element constituted by heat-softenable solid polymer in said reservoir, removing said element from said reservoir, draining excess polymerizable liquid from said element, and then completing the cure of said element to strengthen the same.

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**4,942,002**

**PROCESS FOR CONVERTING CARBON BLANKS INTO GRAPHITE ELECTRODES**

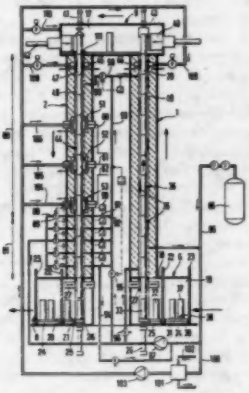
**Horst J. Feist, Am Mühlgraben 7, D-6969 Hardheim, Fed. Rep. of Germany**

**Filed Jul. 18, 1989, Ser. No. 381,603**

**Claims priority, application Fed. Rep. of Germany, Jul. 18, 1988, 3824323**

**Int. Cl.[5] C01B *31/04***

**U.S. Cl. 264—27** **29 Claims**



1. A process for converting substantially identical dimensionally stable carbon blanks into graphite electrodes, comprising the steps of accumulating the blanks into at least one column wherein the blanks are disposed on top of each other; thermally insulating the blanks of the at least one column from the surrounding atmosphere; advancing the at least one column along a predetermined path; preheating the blanks in a first portion of said path; directly heating the preheated blanks with electric current in a second portion of the path downstream of the first portion to graphitize the blanks; cooling the blanks in a third portion of said path downstream of the second portion; establishing a layer of inert gas around the column of blanks in said path; withdrawing inert gas from the third portion of the path; and returning the withdrawn gas into the first portion of the path.

## 4,942,003

## METHOD FOR CONTINUOUSLY PRODUCING MOLDED MEMBERS FROM A MIXTURE OF GYPSUM AND FIBROUS MATERIAL

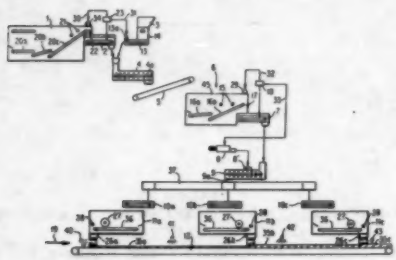
**Jörg Bold, Kaiserslautern, Fed. Rep. of Germany, assignor to "Würtex" Maschinenbau Hofmann GmbH & Co., Uhingen, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 791,225, Oct. 25, 1985, abandoned. This application Mar. 3, 1989, Ser. No. 319,800**

**Claims priority, application Fed. Rep. of Germany, Oct. 27, 1984, 3439493**

**Int. Cl.[5] B28C *5/40***

**U.S. Cl. 264—40.4** **36 Claims**



1. A method of continuously producing molded members as plaster-of-Paris construction plates or panels from a mixture of calcinated gypsum having porous granular structure and dry fibrous material purposely added thereto; measuring respective measured-out quantities of said calcinated gypsum and said dry fibrous material which in a first mixing stage are then subjected to scattering as strewn out for being fervently and thoroughly mixed together, weighing the still dry calcinated gypsum/dry fibrous material mixture and subsequently then moistening the mixture by stepwise adding of water beginning in a second mixing stage by supplying water added as dosaged thereto in conformity with the measured weight of said dry mixture with only so much water being added at least as far as to a stoichiometric water quantity as necessary for absorption by the calcinated gypsum/dry fibrous material mixture for setting and curing thereof while continuously mixing the gypsum/fibrous material to assure said second mixing stage proceeding without any clumping or granulation of the gypsum-fibrous mixture arising therewith; dispersing the moistened mixture subsequently onto a support means including a forming line to progressively form multi-layer molded members, with the surface of each molded member being subjected to additional moistening with an over-stoichiometric quantity of water so that curing is assured with transport of calcium-sulfate ions in all directions so that said molded members as plaster-of-Paris construction plates or panels have only a small or nominal bonding or binding-off and drying time, and the latter then being compacted; said method further includes the improvement in combination therewith comprising the steps of:

dividing a mass flow of said calcinated gypsum/dry fibrous material mixture into several independent partial mass flows separate from each other such that via said dividing into partial mass flows there is attained a result whereby solely further post-wetting or subsequently moistening is made possible respectively in an adequate uniform manner;

dispersing a first one of said partial mass flows onto said forming line of said support means as a first layer of a given one of said molded members;

respectively dispersing a second and subsequent ones of said partial mass flows progressively onto said first and subsequent layers of said given molded member as a second and subsequent layers thereof;

additionally and subsequently moistening each of said layers respectively each with water individually prior to dispersing a subsequent layer thereon, with the total quantity of water supplied for a given molded member including intentionally aimed setting and adjustment of an over-stoichiometric water content equalling only up to a maximum of 25% based on mass of said dry calcinated gypsum above the stoichiometric quantity of water mathematically and analytically necessary for bonding or binding of the calcinated gypsum-dry fibrous material as required for curing of the calcinated gypsum/dry fibrous material mixture dispersed to form said given molded member;

providing high strength in the molded member even with brief curing-drying time and only nominal deviation;

assuring that surface uniformity exists in the entire molded member when finished free of any pocks and pitting;

growing crystals together in situ for assuring uniformity and smoothness of the surface of the molded members; and

simultaneously matting the layers together and interlocking the crystals to result in a continuous high mechanical strength over entire surfaces and cross section of the produced molded member finished as the plaster-of-Paris construction plate or panel with this high mechanical strength thereof simultaneously also having only a small or nominal deviation or divergence accordingly to be uniform over and throughout the entire plaster-of-Paris construction plate or panel with very smooth surfaces being obtained.

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## 4,942,004

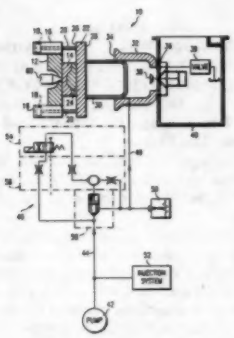
## METHOD AND APPARATUS FOR REGULATING MOLD CLAMPING FORCE IN AN INJECTION MOLDING MACHINE

**John C. Catanzaro, Lebanon, Ohio, assignor to Cincinnati Milacron Inc., Cincinnati, Ohio**

**Filed Nov. 1, 1988, Ser. No. 265,709**

**Int. Cl.[5] B29C *45/82***

**U.S. Cl. 264—40.5** **10 Claims**



1. A method for regulating the clamping force in an hydraulic clamp cylinder of an injection molding machine, wherein a flow control valve is provided to control the flow of pressurized hydraulic fluid from a pump to the clamp cylinder, said method comprising:

(a) providing a clamping force set point value corresponding with a desired clamping force to be provided by a clamp hydraulic cylinder during a clamp force maintenance portion of a clamp operating cycle;

(b) determining a desired clamp cylinder hydraulic pressure value corresponding with the desired clamping force value;

(c) sensing actual hydraulic pressure in the hydraulic clamp cylinder during a first clamp operating cycle to provide an

actual clamp cylinder hydraulic pressure during the clamp force maintenance portion of the clamp operating cycle;

(d) comparing the actual clamp cylinder hydraulic pressure with the desired clamp cylinder hydraulic pressure to provide a signal representative of the actual pressure difference between the actual and the desired pressures; and

(e) during the next succeeding clamp operating cycle, controlling the time of closing of the flow control valve connected with the clamp hydraulic cylinder, relative to the time of closing of the flow control valve during the preceding clamp operating cycle, by adding at least a part of the actual pressure difference in the preceding cycle to the pressure value sensed during the preceding cycle while the clamp was in the clamp force maintenance portion of the clamp operating cycle to provide a control signal to close the flow control valve at a time in the clamp operating cycle to provide a clamping force that is closer to the desired clamping force.

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**4,942,005**

## METHOD OF MAKING A SHAPED POLYESTER ARTICLE

**Mark A. Pollock, Johnson City; William J. Stowell, and James J. Krutak, both of Kingsport, all of Tenn., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Division of Ser. No. 47,821, May 5, 1987, Pat. No. 4,770,931. This application Jun. 13, 1988, Ser. No. 205,882**

**Int. Cl.[5] B29C *41/30, 47/02, 49/08*; B32B *3/26***

**U.S. Cl. 264—45.3** **6 Claims**

1. The method of forming a shaped article having at least one major surface comprising a continuous phase of polyester having dispersed therein microbeads of cellulose acetate at least partially bordered by void space oriented generally flatwise with respect to said major surface of said shaped article, said sheet when consisting only of said polyester continuous phase and said microbeads at least partially bordered by void space characterized by having a Kubelka-Munk R value (infinite thickness) of about 0.90 to about 1.0 and the following Kubelka-Munk values when formed into a 3 mil thick film:

Opacity — about 0.78 to about 1.0

SX — 25 or less

KX — about 0.001 to 0.2

T(i) — about 0.02 to 1.0

said method comprising

(a) forming a mixture of molten polyester and cellulose acetate, wherein the cellulose acetate is a multiplicity of uniformly dispersed microbeads throughout said polyester, said polyester having an I.V. of at least 0.55, said cellulose acetate having an acetyl content of about 28 to 44.8% by weight, a viscosity of about 0.01–90 seconds and a Tg of about 20° C. higher than the Tg of said polyester,

(b) forming a shaped article from said mixture,

(c) orienting said article by stretching at least in one direction to form microbeads of said cellulose acetate uniformly distributed throughout said article and voids at least partially bordering said microbeads on sides thereof in the direction(s) of orientation.

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**4,942,006**

## METHOD OF AND APPARATUS FOR INJECTION MOLDING WITH PRESSURIZED-FLUID ASSIST

**Norman S. Loren, Warren, Mich., assignor to Michael Ladney, Sterling Heights, Mich.**

**Filed Dec. 1, 1988, Ser. No. 277,233**

**Int. Cl.[5] B29C *45/00, 45/34, 45/76, 67/20***

**U.S. Cl. 264—50** **39 Claims**

36. A method for making a structural foam article from a foamable resin having a softening point in an injection molding system including a pressurized fluid source, a mold having interior surfaces and an injection nozzle having a nozzle body for establishing a flow path for molten resin and a valve means having a piston and a tip portion operatively associated with the piston to move therewith, the method comprising the steps of: (a) pressurizing the mold to a predetermined pressure; (b) injecting an amount of foamable resin sufficient for at least partial preparation of the article from the injection nozzle through an injection aperture in the mold, the resin being in communication with a first surface of the piston to cause the tip portion to move towards its open position; (c) causing the piston to move by differential pressure at the valve means to thereby move the tip portion to its closed position; (d) relieving the pressure within the mold to permit foaming by the resin; (e) cooling the article to a temperature beneath the softening point of the resin; and (f) opening the mold to remove the article wherein the improvement comprises:

pressurized fluid from the fluid source applies at least a portion of the differential pressure to urge the tip portion towards its closed position.

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**4,942,007**

## CONTINUOUS PREPARATION OF SHAPED LONG ARTICLES OF POLYIMIDE

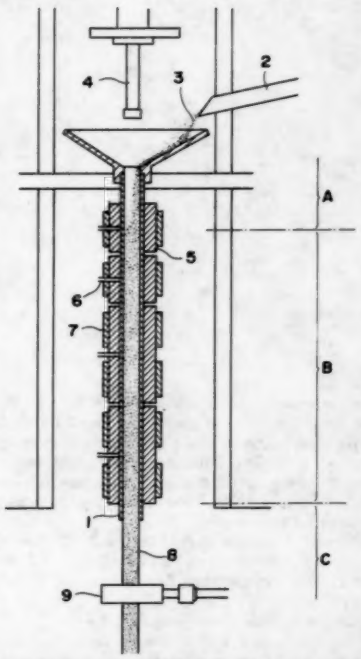
**Akihiro Kunimoto, Ube, and Noboru Umemoto, Kuwana, both of Japan, assignors to Ube Industries, Ltd., Ube and NTN-Raion Industries, Co., Ltd., Tokyo, both of, Japan**

**Continuation of Ser. No. 888,929, Jul. 23, 1986, abandoned. This application Jan. 14, 1988, Ser. No. 145,661**

**Claims priority, application Japan, Jul. 25, 1985, 60-164950**

**Int. Cl.[5] B29C *47/54***

**U.S. Cl. 264—122** **9 Claims**




1. A method of continuously forming a shaped long article of an aromatic polyimide powder which comprises repeating the steps of:

supplying a powdered mixture containing 100 weight parts of a powder of an aromatic polyimide having been prepared by polymerization-imidation of a tetracarboxylic acid containing not less than 50 mol.% of a biphenyltetracarboxylic acid or its derivative and an aromatic diamine; and having a heat loss ratio of not more than 2 wt.%, the heat loss ratio being measured at 360° C. for 1

hour; and having a mean particle size in the range of 0.1 to 40 μm; and 0.2 to 8 weight parts of a fluororesin powder having a mean particle size not larger than 40 μm; to a ram-extrusion apparatus having a mold; and

ram extruding the powdered mixture at a temperature of not lower than 300° C. and at a pressure in the range of 100–1,500 kg/cm², using a back pressure-supplying means which is provided outside of the mold, is maintained at a temperature of not higher than 300° C., and gives a back pressure in the range of 20 to 250 kg/cm², thereby producing a shaped article.

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**4,942,008**

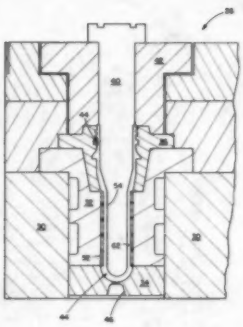
## PROCESS FOR MOLDING A MULTIPLE LAYER STRUCTURE

**John W. Cahill, 1827 Blossom Ct., Yorktown Hts., N.Y. 10598**

**Continuation of Ser. No. 753,402, Jul. 10, 1985, abandoned. This application Aug. 25, 1988, Ser. No. 238,979**

**Int. Cl.**[5] **B29C** *45/14, 45/16, 45/34*

**U.S. Cl. 264—150** **19 Claims**



1. An injection molding process for making a multiple layer, plastic structure, and for use with a mold forming a mold cavity and including an axially extending cavity surface forming at least a portion of the mold cavity, said cavity surface having a substantially cylindrical shape tapering axially upwardly outwardly, the method comprising the steps of:

providing a plastic tube;

cutting off a portion of the plastic tube to form a hollow, plastic sleeve having an initial, generally hollow cylindrical shape and including first and second opposite, open axial ends;

placing the plastic sleeve in the mold;

closing the mold to enclose the sleeve in the mold cavity;

conducting a flowing, heated plastic into the mold cavity and through the first open axial end of the sleeve and into the interior thereof;

forcing the flowing plastic radially outward against the sleeve to force the sleeve outward from said initial shape and into a shape conforming with the shape of said cavity surface, and to form, with the sleeve, an integrally bonded laminated structure;

opening the mold; and

removing the structure from the mold.

**4,942,009**

## METHOD OF MANUFACTURING A FERRULE

**Tsutomu Ohshima, Ayase, Japan, assignor to Amp Incorporated, Harrisburg, Pa.**

**Continuation of Ser. No. 225,584, Jul. 27, 1988, abandoned, which is a continuation of Ser. No. 47,224, May 7, 1987, abandoned. This application Mar. 21, 1989, Ser. No. 326,438**

**Claims priority, application Japan, Sep. 27, 1985, 62-214442**

**Int. Cl.**[5] **B29C** *33/30, 33/76, 45/36*

**U.S. Cl. 264—317** **15 Claims**

1. In a method of manufacturing a ferrule having a small hole in a front end of the ferrule in which a core of an optical fiber is to be received, comprising the steps of; positioning a wire having a diameter of the small hole in a cavity of moulding means for forming the ferrule, introducing mouldable material in the cavity for forming the ferrule by the moulding means with the wire extending through the end of the ferrule, and removing the wire from the end of the ferrule whereby the small hole is formed therein, the improvement comprising the steps of;

passing the wire along a hole through a moveable core that is positioned in the cavity prior to introducing mouldable material in the cavity for forming the ferrule over the core, and

moving the core and the wire to draw out the core and the wire from the ferrule without having to remove the wire from the core.

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**4,942,010**

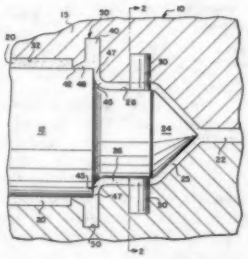
## METHOD OF INJECTION MOLDING OF TUBULAR PARTS TO ELIMINATE WELD LINES

**W. Howard Baker, Hartsville, Tenn., assignor to Wynn's-Precision, Inc., Lebanon, Tenn.**

**Continuation of Ser. No. 104,606, Nov. 18, 1987, abandoned, which is a division of Ser. No. 886,959, Jul. 17, 1986, Pat. No. 9,711,602. This application Mar. 23, 1989, Ser. No. 328,732**

**Int. Cl.**[5] **B29C** *31/04*

**U.S. Cl. 264—328.12** **2 Claims**



1. In the delivery of molten plastic material to a mold in the manufacture of tubular plastic parisons in which the plastic material is delivered to the mold through a passageway, and in which the material is parted by an flow-dividing impediment in the passageway, the method of mixing said material downstream of said impediment to eliminate the weld line otherwise formed in the products by the impediment, comprising the steps of causing said material downstream of said impediment, comprising the steps of causing siad material downstream of said impediment and prior to delivery thereof to said mold to move in a direction generally radially outwardly into an annular mixing chamber which has increasing internal volume with increasing radial dimensions, causing said material to reverse direction in said chamber and flow radially inwardly upon itself while within said chamber to a constricted exit region at a radially inner portion of said chamber, whereby the movement of said material into an increasing volume followed by

radial inflow upon itself induces frictional heat and causes remixing of said material across the weld line formed by the flow-dividing impediment.

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4,942,011

**PROCESS FOR PREPARING SILICON CARBIDE FIBERS**

John D. Bolt, Landenberg; Steven M. Dinh, Chadds Ford, both of Pa., and Lee A. Silverman, Newark, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.

Filed May 3, 1988, Ser. No. 189,812
Int. Cl.[5] D01F *9/14*
U.S. Cl. 264—29.2 13 Claims

1. A process for making silicon carbide fibers by mixing a polymeric silicon carbide precursor with silicon carbide particles, spinning the mixture to form a green fiber, drawing the fiber to attenuate it and heating the fiber wherein the volume ratio of silicon carbide particles to polymeric silicon carbide precursor is selected so that the green fibers can be heated without slumping, and so that the density of the fiber following heating is maximized.

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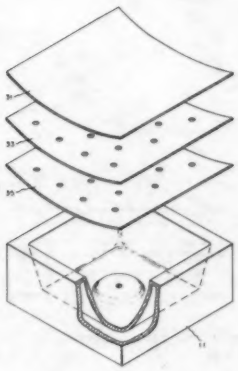
4,942,012

**PREPARATION OF LAMINATED STRUCTURES BY THERMOFORMING**

Walter J. Lee, Albany, N.Y., and Catherine S. Hissem, Pittsfield, Mass., assignors to General Electric Company, Schenectady, N.Y.

Continuation of Ser. No. 270,992, Nov. 14, 1988, abandoned. This application Aug. 21, 1989, Ser. No. 396,834
Int. Cl.[5] B29C *51/10, 51/42*
U.S. Cl. 264—510 12 Claims



1. A method for producing a thermoformed article which comprises the steps of:

feeding multiple layers of formable material to a mold while heating said mold, the layer outermost from the mold being non-perforated and the other layers being perforated;

vacuum forming said layers to the mold contours, thus producing a molded article;

heating the perforated layers to cause them to flow and seal the perforations; and

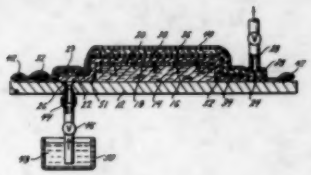
removing said molded article from the mold.

4,942,013

**VACUUM RESIN IMPREGNATION PROCESS**

Raymond J. Palmer, Newport Beach; Gerard R. Bonnar, Irvine, and William E. Moore, Lytle Creek, all of Calif., assignors to McDonnell Douglas Corporation, Long Beach, Calif.

Filed Mar. 27, 1989, Ser. No. 329,029
Int. Cl.[5] B29C *43/12*
U.S. Cl. 264—511 32 Claims



32. In a process for vacuum impregnation of a fiber reinforcement with a resin to produce a resin-fiber composite, the steps which comprise:

applying a dry fiber reinforcement layer on a tool,

positioning a bleeder layer over said fiber reinforcement layer,

applying a vacuum bag over the entire assembly,

providing a source of liquid resin and a resin inlet line to the assembly and communicating with said bleeder layer,

providing a source of vacuum communicating with said vacuum bag,

drawing a vacuum to permit passage of the liquid resin through said resin inlet line,

spreading the resin flow from the resin inlet line for the full width of said fiber reinforcement layer transversely from edge to edge thereof, and

flowing said liquid resin along a flow path through said bleeder layer and into and through the fiber reinforcement layer longitudinally therein from one end thereof to the opposite end of the fiber reinforcement layer to impregnate same uniformly across the length and width of the fiber reinforcement layer.

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4,942,014

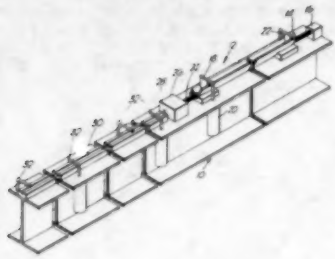
**NUCLEAR FUEL PIN FABRICATION**

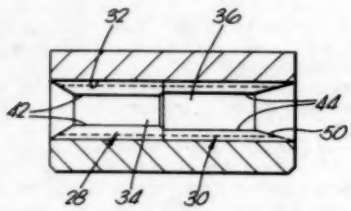
Kenneth M. Durow, Blackpool, United Kingdom, assignor to United Kingdom Atomic Energy Authority, London, England

Division of Ser. No. 83,282, Aug. 10, 1987, Pat. No. 4,849,156. This application Jan. 3, 1989, Ser. No. 292,957
Claims priority, application United Kingdom, Aug. 15, 1986, 8619948
Int. Cl.[5] G21C *21/00*
U.S. Cl. 376—261 10 Claims

1. A nuclear fuel pellet loading apparatus comprising a body having a guide passage which will allow feed therethrough of nuclear fuel pellets up to a predetermined diameter, the guide passage having a cross-section which is oversized relative to a pellet of said predetermined diameter and is provided with means for locating a pellet of said predetermined diameter in a well-defined position with clearance between the pellet and at least a major part of the passage wall, and a body having a pin-receiving passage, which pin-receiving passage allows insertion therein of a generally cylindrical nuclear fuel pin up to a predetermined diameter, the pin-receiving passage having a cross-section which is oversized relative to said pin of said predetermined diameter, the pin-receiving passage being provided with means for locating a pin of said predetermined diameter in a well-defined position with respect to the guide passage and with clearance between the pin and at least a

major part of the pin-receiving passage wall, and said locating means of the pin-receiving passage comprising a plurality of






internally projecting ribs whose inner extremities are inscribed by a circle of predetermined diameter.

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**4,942,015**

## METHOD FOR PREVENTING AND REPAIRING VIBRATIONAL DAMAGE TO NUCLEAR FUEL RODS

**Gary J. Busselman, Richland, and Adolfo Reparaz, Kennewick, both of Wash., assignors to Advanced Nuclear Fuels, Corp., Richland, Wash.**

**Continuation of Ser. No. 153,124, Feb. 8, 1988, abandoned, which is a division of Ser. No. 48,478, May 6, 1987, Pat. No. 4,784,825, which is a continuation of Ser. No. 630,878, Jul. 13, 1984, abandoned, which is a continuation-in-part of Ser. No. 487,907, Apr. 25, 1983, abandoned, which is a continuation-in-part of Ser. No. 461,276, Jan. 26, 1983, abandoned. This application Sep. 5, 1989, Ser. No. 403,991**

**Int. Cl.[5] G21C *19/00***

**U.S. Cl. 376—261** **5 Claims**

1. In a fuel rod assembly including a plurality of spaced apart grid spacers for holding a plurality of fuel rods of said assembly in a predetermined position within said assembly, a tie plate located at the top of said assembly and rigidly secured to the ends of said fuel rods, a method for repairing a fuel rod assembly having a damaged peripherally located fuel rod, by replacing said damaged fuel rod with an inert rod, comprising the steps of:

removing from the uppermost one of said plurality of grid spacers a sufficient portion of said grid spacer to free said damaged fuel rod;

pulling the freed upper portion of said damaged fuel rod through the removed portion of said grid spacer, away from said fuel rod assembly;

pulling said damaged fuel rod upward to slide it out of the other ones of said grid spacers and ultimately out of said fuel rod assembly;

sliding said inert rod into the space and grid spacer locations formerly occupied by said damaged fuel rod;

pushing the upper end of said inert rod through the removed portion of the uppermost one of said grid spacers; and

securing said inert rod to selected ones of said fuel rods juxtapositioned on either side of said inert rod, thereby securing said inert rod into said fuel rod assembly.

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**4,942,016**

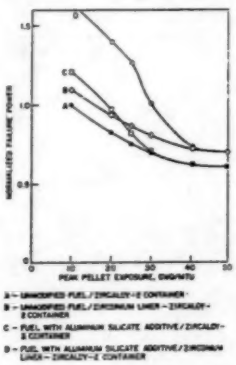
## NUCLEAR FUEL ELEMENT

**Mickey O. Marlowe; Herman S. Rosenbaum, both of Fremont; Trevor C. Rowland, San Jose; Charles B. Patterson, Jr., San Jose, and John H. Davies, San Jose, all of Calif., assignors to General Electric Company, San Jose, Calif.**

**Filed Sep. 19, 1988, Ser. No. 245,482**

**Int. Cl.[5] G21C *3/00***

**U.S. Cl. 376—418** **10 Claims**




1. A nuclear fuel element comprising an elongated composite cladding container of a zirconium alloy tube consisting of constituents, other than the zirconium, in amounts greater than about 5000 parts per million by weight and having a barrier lining of zirconium metal in a thickness of from about 5 percent to about 30 percent of the thickness of said alloy tube, metallurgically bonded to the inner surface of the alloy tube, a central core of nuclear fuel material disposed within and partially filling said lined tubular container so as to leave a gap between said container and fuel providing the core, said nuclear fuel material being selected from the group consisting of compounds of uranium, plutonium, thorium and mixtures thereof which contain dispersed therethrough an additive of aluminum silicate in an effective amount up to about 5 percent by weight of the fuel material.

**4,942,017**

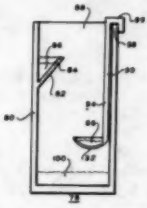
## RANDOM ACCESS CHEMISTRY ANALYZER

**Jon D. Turpen, Jackson, N.J., assignor to Turpen Laboratory Systems, Inc., Lakewood, N.J.**

**Division of Ser. No. 801,052, Nov. 22, 1985. This application Nov. 25, 1987, Ser. No. 125,216**

**Int. Cl.[5] G01N *35/00***

**U.S. Cl. 422—64** **7 Claims**



1. A chemical analyzer system, comprising:

rotatable sample holding means having at least two cuvette means, each of said at least two cuvette means including a sample or reagent holding means, said sample or reagent holding means being a detachably removable spoon, said spoon having a detachably removable attachment means;

light source means;

filter means; and

light detection means, said light detection means including a photomultiplier tube, wherein said filter means and said rotable sample holding means are in the optical path of the light generated by said light source means and wherein said light detection means is at the end of said optical path.

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**4,942,018**

## PACKED BED GRADIENT GENERATOR FOR HIGH PERFORMANCE LIQUID CHROMATOGRAPHY

**Miner N. Munk, Lake Park, Fla., assignor to LDC Analytical Inc., Riviera Beach, Fla.**

**Continuation of Ser. No. 13,124, Feb. 10, 1987, abandoned. This application Mar. 23, 1989, Ser. No. 328,750**

**Int. Cl.[5] G01N *30/02***

**U.S. Cl. 422—70** **4 Claims**

1. Apparatus for generating a solvent gradient composition for use in a high performance liquid chromatographic column from a first solvent and a second solvent, the solvent gradient composition approximating an error function, comprising:

a hollow cylindrical tube having an inlet port and an outlet port, said inlet port permitting the flow of a first solvent and a second solvent into said tube and said outlet port permitting flow of a solvent gradient composition out of said tube;

a packed bed means located within said tube and between said inlet and outlet ports for generating a solvent gradient composition approximating an error function from said first solvent and said second solvent when said first solvent is passed through said packed bed means and, after the flow of said first solvent through said packed bed means has stopped, said second solvent is subsequently passed through said packed bed means,

said packed bed means comprising a plurality of chemically inert millimeter sized spherical beads,

a chromatographic column operatively coupled to said outlet port of said tube, and

pumping means for sequentially pumping said first solvent into said tube and through said packed bed and chromatographic column and said second solvent into said tube and through said packed bed and, for pumping the solvent gradient composition, as generated by said packed bed means, out of said packed bed means and into said chromatographic column.

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**4,942,019**

## GAS PURIFIER

**Paul D. Goodell, Ridgewood, N.J., and Lawrence C. Mitchell, Sr., Anaheim, Calif., assignors to Ergenics, Inc., Ringwood, N.J.**

**Filed Sep. 28, 1988, Ser. No. 250,433**

**Int. Cl.[5] F01N *3/10*; B01D *53/04***

**U.S. Cl. 422—169** **3 Claims**

1. In a system for processing a gas, an apparatus comprising:

a main container having an end wall, a rear wall, and an annular side wall defining a substantially closed chamber;

an intake fitting penetrating through the end wall and having an intake projecting from the chamber and having inside the chamber a filter element;

an outlet fitting penetrating through the end wall and having an outlet projecting from the chamber offset from the intake and having inside the chamber a filter element offset from the filter element of the intake fitting;

means defining in the chamber an internally sealed well between the filters; a baffle in the chamber between the filters and extending toward the annular side wall, whereby gas passing between the filters is diverted from the intake around the baffle to the outlet;

a heater in the well;

an outer container surrounding the main container and defining a space thereabout;

means in the space for insulating the main container from the outer container; and an active material generally filling the chamber around the filters and well.

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**4,942,020**

## CONVERTER FOR REMOVING POLLUTANTS FROM A GAS STREAM

**William A. Whittenberger, Garrettsville, Ohio; Edward M. Smith, Wyncote, Pa.; William R. Alcorn, Cleveland Heights, and Wesley P. Bullock, Windham, both of Ohio, assignors to W.R. Grace & Co.-Conn., New York, N.Y.**

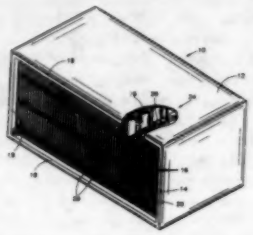
**Filed Jun. 27, 1988, Ser. No. 211,864**

**Int. Cl.[5] B01J *35/04*; F01N *3/28***

**U.S. Cl. 422—180** **23 Claims**

1. A converter for altering the composition of gases passing therethrough and comprising a gas inlet and a gas outlet; a plurality of individual layers having a predetermined length and extending between the inlet and outlet, said layers being normally nestable corrugated thin metal foil having on each surface thereof a coating comprising a refractory metal oxide and optionally a heavy metal catalyst deposited thereon; and a plurality of flexible fibers positioned between said layers and extending cross-wise of the corrugations and each said fiber having a length sufficient to span said predetermined length in

a direction parallel to the gas flow between the inlet and the outlet wherein said layers are partially nested and separated



from each other by a distance substantially equal to the thickness of said fibers.

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**4,942,021**

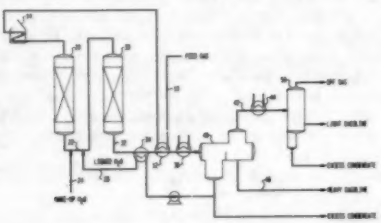
## MULTISTAGE SYSTEM FOR CONVERSION OF LOWER OLEFINS WITH REACTOR QUENCHING MEANS

**William E. Garwood, Haddonfield; Frederick J. Krambeck, Cherry Hill, both of N.J.; John D. Kushnerick, Boothwyn, Pa., and Samuel A. Tabak, Wenonah, N.J., assignors to Mobil Oil Corporation, New York, N.Y.**

**Continuation-in-part of Ser. No. 775,906, Sep. 13, 1985, abandoned, which is a continuation-in-part of Ser. No. 903,915, Sep. 5, 1986, Pat. No. 4,740,645, which is a continuation-in-part of Ser. No. 650,594, Sep. 14, 1986, Pat. No. 4,749,820. This application Dec. 23, 1987, Ser. No. 137,224**

**Int. Cl.[5] B01T *8/04***

**U.S. Cl. 422—194** **9 Claims**



**2. A continuous multi-stage catalytic apparatus for converting ethene-rich lower olefinic feedstock containing reducing gas to heavier liquid hydrocarbon product comprising gasoline and/or distillate range hydrocarbons, comprising in combination:**

**first reactor means containing a first catalyst for contacting ethene-rich feedstock under oligomerization conditions at elevated temperature and moderate pressure in a primary stage reaction zone with said first catalyst comprising shape selective medium pore zeolite to convert at least a portion of the lower olefinic feedstock to intermediate olefinic hydrocarbons and obtain a primary stage reaction effluent comprising unreacted ethene, reducing gas and said intermediate olefinic hydrocarbons;**

**means for cooling said primary stage reaction effluent by introducing a stream of cold water sufficient to reduce the primary stage effluent to second stage reaction temperature; and**

**second reactor means containing a second catalyst for contacting cooled primary stage reaction effluent containing unreacted ethene, reducing gas and at least a portion of the intermediate olefinic hydrocarbons and said water with said second catalyst comprising a secondary stage ionic nickel-containing shape selective medium pore zeolite oligomerization catalyst in a second stage reaction zone at elevated temperature to produce said heavier liquid hydrocarbon product comprising gasoline and/or distillate range hydrocarbons; said water being present in an amount sufficient to maintain selectively of the nickel zeolite catalyst to said heavier liquid hydrocarbon product.**

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**4,942,022**

## CATALYTIC REACTOR

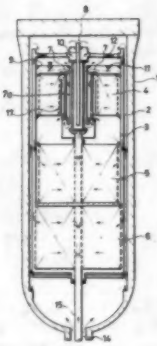
**Hiroshi Kasai, Tokyo, and Yuji Kawamoto, Chiba, both of Japan, assignors to Toyo Engineering Corporation, Tokyo, Japan**

**Filed Dec. 30, 1987, Ser. No. 139,609**

**Claims priority, application Japan, May 18, 1987, 62-118961**

**Int. Cl.[5] B01J *8/04***

**U.S. Cl. 422—201** **9 Claims**



**1. A vertical catalytic reactor wherein a reaction gas is contacted with solid catalyst means to cause an exothermic conversion reaction whereby to produce a reaction product gas, comprising: an upright reaction vessel having a vertical central axis; a plurality of catalyst beds within said reaction vessel, said catalyst beds being coaxial with and arranged in a vertical stack along said vertical central axis and arranged for sequential flow of said reaction gas therethrough, each of said catalyst beds being composed of a top wall, a bottom wall and inner and outer, cylindrical, perforate, gas-transmitting, upright, side walls, said walls defining an annular space which is packed with the solid catalyst and through which said reaction gas can flow radially; a plurality of heat exchangers in said vessel and coaxial with said vertical central axis, said heat exchangers being connected to said catalyst beds for cooling the effluent reaction gas from each catalyst bed before it is flowed into the next one of said sequentially arranged catalyst beds, at least two of said heat exchangers being disposed in the upper portion of said reaction vessel at substantially the same vertical level therein as the upper most catalyst bed, said two heat exchangers including first passage means for flowing the effluents from two of said catalyst beds separately to said two heat exchangers, respectively, so that said effluents are separately cooled in said two heat exchangers, and second passage means for flowing the feed reaction gas being fed into said reactor through said two heat exchangers in series and in indirect heat exchange relationship with said effluents in said two heat exchangers so that said feed reaction gas acts as colder gas in said two heat exchangers, and conduit means for removing the effluent gas from the last of said catalyst beds as said reaction product gas.**

4,942,023

## METAL EXTRACTION PROCESS WITH SUBSTITUTED 8-HYDROXYQUINOLINE

Achille J. De Schepper, Lichtaart; Guy G. Haesebroek, Mortsel, and Antoine L. Van Peteghem, Olen, all of Belgium, assignors to Metallurgie Hoboken-Overpelt, Hoboken, Belgium

Filed Dec. 21, 1988, Ser. No. 287,143

Claims priority, application Luxembourg, Jan. 18, 1988, 87108

Int. Cl.[5] C01G *1/00*

U.S. Cl. 423—22 10 Claims

1. In a process for separating a metal, that forms a complex with a substituted 8-hydroxyquinoline, from an aqueous solution containing said metal, comprising the steps of

(a) preparing a liquid or solid organic phase containing a substituted 8-hydroxyquinoline extractant,

(b) contacting the aqueous solution with the organic phase at such a pH that at least part of said metal is transferred from the aqueou solution into the organic phase, whereby producing an aqueous solution depleted in said metal and an organic phase loaded with said metal,

(c) separating the aqueous solution depleted in said metal from the organic phase loaded with said metal,

(d) recovering said metal from the loaded organic phase, and

(e) reusing in step (b) the organic phase that has been unloaded in step (d),

the improvement which comprises minimizing the degeneration rate of the extractant by using in step (a) a substituted 8-hydroxyquinoline extractant that has, in the undiluted state, a substituted 8-hydroxyquinoline content of at least 90 wt%.

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4,942,024

## METHOD FOR REFINING HYDROXIDES OF NIOBIUM AND TANTALUM CONTAINING TRANSITION METALS

Hiromi Sasaki; Tadasi Tanaka, and Yasusi Muneno, all of Ube, Japan, assignors to Central Glass Company, Limited, Ube, Japan

Filed Jun. 2, 1989, Ser. No. 364,081

Claims priority, application Japan, Jun. 13, 1988, 63-143618

Int. Cl.[5] C01G *33/00, 35/00*

U.S. Cl. 423—65 4 Claims

1. A method of refining hydroxide of a metal of Group V selected from the group consisting of niobium and tantalum, the metal hydroxide containing transition metals as impurities, the method comprising the steps of:

(a) dissolving the metal hydroxide in an aqueous solution of an acid selected from the group consisting of hydrofluoric acid and oxalic acid;

(b) adjusting the pH of the aqueous solution of the metal hydroxide to a value in the range from 1 to 4;

(c) after step (b) maintaining the temperature of the aqueous solution of the metal hydroxide not higher than 60° C. and adding ammonium pyrrolidinedithiocarbamate to the solution such that ammonium pyrrolidinedithiocarbamate amounts to at least 0.05 wt % of $M_2O_5$, where M represents said metal, that can be formed from the metal M contained in the solution to thereby form a precipitate containing transition metals;

(d) removing said precipitate from the solution of the metal hydroxide; and

(e) after step (d) raising the pH of the solution of the metal hydroxide to a value not lower than 6 to cause precipitation of refined metal hydroxide.

4,942,025

## PROCESS FOR THE MANUFACTURE OF GRANULAR MONOHYDRATED SODIUM PERBORATE

Antonino Condò, Milan, and Renzo Ferrario, Coriano Laghetto, both of Italy, assignors to Ausimont S.p.A., Milan, Italy

Continuation of Ser. No. 355,118, May 18, 1989, abandoned, which is a continuation of Ser. No. 205,208, Jun. 10, 1988, abandoned. This application Nov. 3, 1989, Ser. No. 432,309

Claims priority, application Italy, Jun. 17, 1987, 20930 A/87

Int. Cl.[5] C01B *15/12, 35/12*

U.S. Cl. 423—282 9 Claims

1. A process of obtaining granular monohydrated sodium perborate endowed with resistance to abrasion, starting from the corresponding tetrahydrated perborate, characterized in that a carboxylic acid mixture consisting essentially of acetic acid, or alkali metal salt thereof, and formic acid, or alkali metal salt thereof, is added to said tetrahydrated perborate, already present in the granular state, then carrying out a dehydration of the tetrahydrated perborate until the conversion to monohydrated perborate is substantially complete, wherein, at the outlet of the dehydration zone, the moisture content is from 10 to 52 g/kg, the relative humidity is from 10 to 40%, and the temperature is from 45° to 60° C.

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4,942,026

## NOVEL SYNTHESIS OF SODIPOTASSIC COPPER TUBE SILICATES

Balaram Gupta, N. Plainfield; Cheng K. Saw, Summit, both of N.J.; Malcolm E. Kenny, Cleveland Heights, and Bruce A. Harrington, Cleveland, both of Ohio, assignors to Hoechst Celanese Corporation, Somerville, N.J.

Filed May 10, 1989, Ser. No. 349,687

Int. Cl.[5] C01B *33/20, 33/32;* C04B *35/16*

U.S. Cl. 423—326 17 Claims

1. A method of synthesizing a crystalline sodipotassic copper tube silicate specie of the family $Na_{2-2x}K_{2x}CuSi_4O_{10}$ where X is 0, ½ or 1, comprising combining, with an organosilicate at essentially room temperature, stoichiometric amounts of a copper salt, and at least one salt of potassium and sodium, in an aqueous alcohol solution to form a gel, and then sintering the gel at a temperature and for a time sufficient to form said crystalline sodipotassic copper tube silicate.

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4,942,027

## METHOD FOR PREPARING FERRIERITE

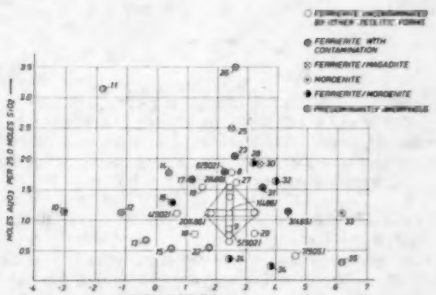
Wayne E. Evans, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Continuation-in-part of Ser. No. 893,430, Aug. 5, 1986, Pat. No. 4,795,623. This application Sep. 28, 1988, Ser. No. 250,874

The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.

Int. Cl.[5] C01B *33/34*

U.S. Cl. 423—328 15 Claims




1. A method of manufacture of sodium ferrierite which comprises crystallizing an aqueous mixture at hydrothermal

crystallizing conditions of from about 100 ° to about 400° C. over a period of time greater than 10 hours and less than 100 hours to form a crystalline sodium ferrierite, said aqueous mixture comprising a sodium compound, one or more aluminum compounds, a silicon compound and one nitrogen compound selected from the group consisting of piperidine, piperazine, pyridine, 4-picoline-N-oxide and 4-picoline, wherein the mole ratios of both the sodium compound and aluminum compound, in relation to the silicon compound, calculated on the basis of the oxide forms of said sodium compound, aluminum compound and silicon compound, are equal to the presence of 1.6 to 3.4 moles of sodium oxide per 25 moles of said silicon oxide and 0.7 to 1.6 moles of said aluminum oxide per 25 moles of said silicon oxide, and wherein water is present in a molar ratio of 5–500 moles of water per mole of said silicon oxide and said nitrogen compound is present in a molar ratio of 0.05 to 1.0 moles of said nitrogen compound per moles of said silicon oxide and where the mole ratio of sodium oxide to aluminum oxide is greater than 1, and calcining said crystalline sodium ferrierite.

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**4,942,029**

## MEDICATED SKIN PREPARATION

**Milton H. Scheps, Largo, Fla., assignor to Smith & Nephew United, Inc., Largo, Fla.**

**Continuation of Ser. No. 909,141, Sep. 19, 1986, abandoned. This application Mar. 14, 1989, Ser. No. 323,625**

**Int. Cl.[5] A61K *31/74***

**U.S. Cl. 424—78** **17 Claims**

1. A medicated skin composition useful for application to human skin to form an antimicrobial barrier on the skin which composition comprises a film forming amount of a copolymer of methylvinylether and maleic acid, an effective amount of a citric acid ester plasticizer for the copolymer, an antimicrobially effective amount of 2,4,4'-trichloro-2'-hydroxydiphenyl ether and a alcohol solvent therefor.

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**4,942,030**

## BIOLOGICAL CONTROL OF WHITEFLIES AND OTHER PESTS WITH A FUNGAL PATHOGEN

**Lance S. Osborne, Altamonte Springs, Fla., assignor to University of Florida Research Foundation, Incorporated, Alachua, Fla.**

**Filed Feb. 12, 1988, Ser. No. 155,332**

**Int. Cl.[5] A01N *63/00*; C12N *1/14, 15/00***

**U.S. Cl. 424—93** **15 Claims**

1. A *Paecilomyces fumosoroseus* which, when in its essentially biologically pure form, has the virulence against whiteflies characteristic of *Paecilomyces fumosoroseus* Apopka, culture deposit ATCC 20874.

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**4,942,031**

## COMPOSITIONS CONTAINING LYCD AND OTHER TOPICALLY ACTIVE MEDICINAL INGREDIENTS

**Robert H. Levin, 11127 Jardin Pl., Cincinnati, Ohio 45241**

**Continuation-in-part of Ser. No. 159,390, Feb. 23, 1988. This application Aug. 16, 1989, Ser. No. 394,862**

**Int. Cl.[5] A61K *35/72, 31/615, 31/56***

**U.S. Cl. 424—520** **18 Claims**

1. A topical composition adapted for application to the skin comprising, in admixture with a pharmaceutically acceptable topical carrier, an antiinflammatory agent and, from about 0.1% to about 3.0% by weight of said composition of Live Yeast Cell Derivative (LYCD) in amounts effective to ameliorate the neuralgic gain associated with a herpes infection when applied to an area of the skin proximate the pain.

**4,942,032**

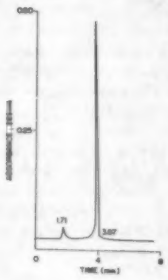
## PROCESS FOR PRODUCING A NOVEL ANTIFUNGAL PRODUCT

**Peter A. Vandenbergh, Sarasota, and Blair S. Kunka, Bradenton, both of Fla., assignors to Microlife Technics, Inc., Sarasota, Fla.**

**Division of Ser. No. 248,438, Sep. 23, 1988. This application Jan. 27, 1989, Ser. No. 302,463**

**Int. Cl.[5] A61K *35/00*; A63B *69/36*; C12R *1/01, 1/255***

**U.S. Cl. 424—115** **21 Claims**




1. A method for producing an antifungal product (AFP) which comprises:

(a) incubating live cells of a Pediococcus species in a growth medium for the cells so as to produce an isolable amount of the product (AFP) in the growth medium, wherein the product (AFP) produced in the growth medium or separated from the growth medium inhibits the growth of *Penicillium oxalicum* as an assay strain and wherein the product (AFP) comprises a compound as an essential ingredient consisting of valine and lactic acid having a molecular weight of about 400 daltons and less than about 500 daltons and has a FAB mass spectrum as shown in FIG. 2; and

(b) treating the growth medium to eliminate most of the live cells of the Pediococcus species and to produce the product (AFP).

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**4,942,033**

## VEGETABLE EXTRACT-BASED COSMETIC OR PHARMACEUTICAL COMPOSITION WHICH ACTS ON CAPILLARY BRITTLENESS

**Lucien Aubert, Cap-D'Ail, and Philippe Anthoine, Nice, both of France, assignors to L'Oreal, Paris, France**

**Continuation of Ser. No. 686,836, Dec. 27, 1984, abandoned. This application Aug. 15, 1986, Ser. No. 896,570**

**Claims priority, application France, Dec. 27, 1983, 83 20826**

**Int. Cl.[5] A61K *35/78***

**U.S. Cl. 424—195.1** **8 Claims**

1. A topical composition for decreasing capillary brittleness, comprising an acceptable carrier and a combination of vegetable extracts comprising:

(i) A dry *Ruscus aculeatus* L. extract having a saponin content of greater than 65% by weight, wherein said combination of vegetable extracts contains from 0.1 to 3% by weight of said *Ruscus aculeatus* L. extract in relation to the overall weight of the composition, said extract being a hydroalcoholic extract of an alcohol having from 3 to 6 carbon atoms; and

(ii) A dry *Salvia officinalis* L. extract comprising ursolic acid, flavonoids, rosmarinic acid, picrosalvin and terpenic products, wherein said combination of vegetable extracts contains from 0.1 to 5% by weight of said dry *Salvia officinalis* L. extract in relation to the overall weight of the composition, said extract being selected from the group

consisting of an aqueous extract, an alcoholic extract, a hydroalcoholic extract and a propylene glycol extract.

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4,942,034

## DENTAL STIMULATOR

Ira D. Hill, Clay Court, Locust, N.J. 07760, and Robert D. White, 65 Glen Gray Rd., Oakland, N.J. 07436

Filed Nov. 14, 1988, Ser. No. 270,165

Int. Cl.[5] A61K 7/16, 7/18; A61C 15/00; A46B 9/04

U.S. Cl. 424—401 6 Claims

1. A porous dental stimulator impregnated with an ingestible, nonfoaming, oral hygiene cleaning preparation that coats mouth surfaces with a plaque matrix disrupting film, said cleaning preparation comprising:

a. a surfactant selected from the group consisting of:
sodium lauryl sulfate,
sodium lauroyl sarcosinate,
polyethylene glycol stearate,
polyethylene glycol monostearate,
coconut monoglyceride sulfate,
sodium alkyl sulfates,
sodium alkyl sulfoacetates,
block copolymers of polyoxyethylene/polyoxybutylene,
allylpolyglycol ether carboxylates,
polyethylene derivatives of sorbitan esters,
propoxylated cetyl alcohol,
block copolymers comprising a cogeneric mixture of conjugated polyoxybutylene polyoxylethylene compounds having as a hydrophobe a polyoxybutylene polymer of at least 1200 molecular weight,
soap powder,
and mixtures thereof, and

b. a coating substance insoluble in said surfactant selected from the group consisting of:
silicones,
silicone glycol copolymers,
polydimethyl siloxanes,
long chain hydrocarbons,
normal paraffins having a chain length of 16 carbon atoms or greater,
paraffins with several loci of branching and unsaturation,
carbowaxes,
polymers with a limited solubility in ethanol and water solutions where the ethanol: water ratio is greater than 0.3:1 but have essentially no solubility in water or saliva at lower concentrations, and mixtures thereof, and

c. wherein the cleaning preparation is present on said dental stimulator at a loading of from about 5 mg to about 50 mg per stimulator.

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4,942,035

## CONTINUOUS RELEASE FORMULATIONS

Jeffrey R. Churchill, Northwich, and Francis G. Hutchinson, Lymm, both of United Kingdom, assignors to Imperial Chemical Industries, London, England

Division of Ser. No. 485,454, Apr. 15, 1983, Pat. No. 4,526,938.

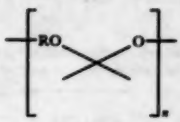
This application Mar. 27, 1985, Ser. No. 716,651

Claims priority, application United Kingdom, Apr. 22, 1982, 8211704

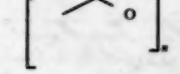
Int. Cl.[5] A61K 31/74, 31/79; A61F 2/00

U.S. Cl. 424—423 6 Claims

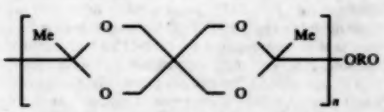
1. A pharmaceutical composition comprising a pharmacologically effective amount of a pharmacologically useful polypeptide and a pharmaceutically or veterinarily acceptable amphipathic, non-cross-linked linear, branched or graft block copolymer, which has a minimum weight average molecular weight of 5,000, in which the hydrophobic component is biodegradable or hydrolytically unstable under normal physiological conditions, and the hydrophilic component may or may not be biodegradable, the copolymer being capable of absorbing water to form a hydrogel when placed in water or an aqueous physiological-type environment in an animal body, the amphipathic copolymer being a linear block copolymer of the formula $A_m(BA)_n$ or $B_m(AB)_n$ wherein m is 0 or 1, n is an integer, A is a pharmaceutically or veterinarily acceptable hydrophobic polymer and B is a pharmaceutically or veterinarily acceptable hydrophilic polymer, or the amphipathic copolymer is a graft or branched block copolymer of the formula $AB_n$ or $BA_n$ wherein A, B and n have the meanings stated above and wherein respectively either A or B is a backbone polymer with n units of a monomer or polymer B or A respectively grafted onto it, and wherein A is selected from poly (D-, L- and DL-lactic acids), poly (D-, L- and DL-lactides), polyglycolic acid, polyglycolide, poly-ε-caprolactone, poly(3-hydroxy-butyric acid), non-therapeutic hydrophobic polypeptides, polyacetals of the formula




wherein R is a hydrocarbon radical, and n has the meaning stated above, polycarbonates or polyorthoesters of the formula:




wherein R and n have the meanings stated above, and copolymers of the formula:




wherein R and n have the meanings stated above, and copolymers derived from two or more monomers from which the above polymers are derived; and the pharmaceutically or veterinarily acceptable hydrophilic polymer B is selected from polyvinyl alcohol, polyvinyl pyrrolidone, polyethylene glycol, polyacrylamide, polymethacrylamide, dextran, alginic acid, sodium alginate, and gelatine, and copolymers of two or more of the monomers from which the above polymers are derived, and polyoxyethylene/polyoxypropylene block copolymers.

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4,942,036

## THERAPY BY VESICLE DELIVERY TO THE HYDROXYAPATITE OF BONE

W. Blair Geho, 533 Beechwood St., and John R. Lau, 1634 Morgan St., both of Wooster, Ohio 44691

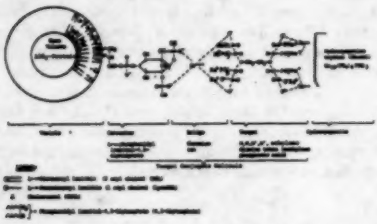
Filed Aug. 25, 1988, Ser. No. 236,253

Int. Cl.[5] A61F 2/00; A61K 37/22; B01J 13/02

U.S. Cl. 424—425 9 Claims

1. The method of providing a continuous supply of chemicals to the body or skeleton of a warm-blooded animal for extended periods of time, comprising preparation of targeted,

permeable, bipolar, lipid vesicles containing said chemicals, said targeted lipid vesicles having affinity for the hydroxyapatite of bone, and administering said targeted vesicles to the internal body compartments of said animal.



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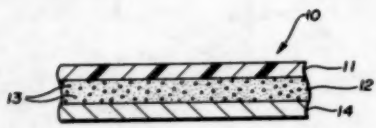
4,942,037

## TRANSDERMAL DELIVERY SYSTEMS

Joseph V. Bondi, Collegeville, and Alice E. Loper, Lederach, both of Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Filed Jun. 2, 1988, Ser. No. 202,088
Int. Cl.[5] A61F 13/02
U.S. Cl. 424—448 2 Claims




1. A therapeutic system in the form of a transdermal patch for administering (+)-PHNO comprising (a) a backing member impermeable to (+)-PHNO, (b) a reservoir of solid silicone polymer matrix containing (+)-PHNO and glycerol wherein the said solid reservoir matrix constitutes a solvent for the drug wherein in said matrix the drug is present in excess of its solubility and there is additionally present glycerol as cosolvent in an amount of from about 0.5 to no greater than 40 percent by weight, (c) a rate controlling membrane of silicone polymer, and (d) optionally a face adhesive and wherein said patch provides said (+)-PHNO at a therapeutic rate of from about 2 micrograms to about 20 micrograms per square centimeter per hour.

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4,942,038

## ENCAPSULATED HUMECTANT

Donald F. H. Wallach, Brookline, Mass., assignor to Micro Vesicular Systems, Inc., Nashua, N.H.

Continuation-in-part of Ser. No. 25,525, Mar. 13, 1987, abandoned, and a continuation-in-part of Ser. No. 78,658, Jul. 28, 1987, Pat. No. 4,885,090, and a continuation-in-part of Ser. No. 124,824, Nov. 24, 1987, Pat. No. 4,917,951, and a continuation-in-part of Ser. No. 157,571, Mar. 3, 1988, Pat. No. 4,911,928. This application Aug. 19, 1988, Ser. No. 234,309
Int. Cl.[5] A61K 7/06, 7/075, 9/127; C09K 3/00
U.S. Cl. 424—450 19 Claims

1. An humectant for use in external animal care products comprising a moisturizer and mineral oil encapsulated in apaucilammelar lipid vesicle said lipid vesicle having a non-phospholipid surfactant selected from the group consisting of glycerol monostearate, glycerol monooleate, and polyoxyethylene sorbitan oleates, palmitates, and stearates as its major lipid component.

13. An humectant for use in animal care products, said humectant in the form of a paucilamellar lipid vesicle comprising a polyoxyethylene fatty ether, cholesterol, and oleic acid, said paucilamellar vesicle encapsulating a moisturizer and mineral oil.

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4,942,039

## EFFERVESCENT ANALGESIC ANTACID COMPOSITION HAVING REDUCED SODIUM CONTENT

Ronald N. Duvall, and Gerald Gold, both of Elkhart, Ind., assignors to Miles Inc., Elkhart, Ind.

Continuation-in-part of Ser. No. 349,113, May 9, 1989, abandoned, which is a continuation-in-part of Ser. No. 296,537, Jan. 12, 1989, abandoned. This application Sep. 5, 1989, Ser. No. 401,064
Int. Cl.[5] A61K 9/46
U.S. Cl. 424—466 9 Claims

1. An effervescent analgesic antacid composition having a reduced sodium content which is capable of being dissolved in water to form a pleasant tasting solution which comprises a mixture of 0.2–16% of an analgesic selected from the class consisting of acetylsalicylic acid, acetaminophen, ketoprofen and mixtures thereof, 26–40% citric acid, 13–21% sodium bicarbonate, 7–12% calcium carbonate, 8–14% potassium bicarbonate, 0–14% glycine, 0.8–1.5% flavors and sweeteners, 0–31% tableting aids other than lubricants, and 0–6% tablet lubricant other than acetylsalicylic acid, said percents being weight percent based on the total weight of the composition.

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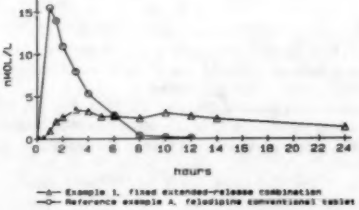
4,942,040

## PHARMACEUTICAL PREPARATION AND A PROCESS FOR ITS PREPARATION

Gert A. Ragnarsson, Bro; Kajsa M. Silfverstrand, Gothenburg, and John A. Sjögren, Mölnlycke, all of Sweden, assignors to Aktiebolaget Hassle, Molndal, Sweden

Filed Sep. 29, 1988, Ser. No. 250,945
Claims priority, application Sweden, Oct. 8, 1987, 8703881
Int. Cl.[5] A61K 9/26
U.S. Cl. 424—486 11 Claims




1. A controlled release preparation for administration once daily and containing a combination of metoprolol and a poorly water soluble a dihydropyridine being a calcium channel blocking agent, wherein metoprolol is included in the form of small beads containing as the main soluble component a salt of metoprolol coated with a waterinsoluble polymeric membrane and the dihydropyridine is dispersed in a non-ionic solubilizer and whereby both the dispersed dihydropyridine and the beads containing metoprolol are incorporated into a matrix forming a swelling gel in contact with water.

4,942,041

## PHARMACEUTICAL COMPOSITIONS EFFECTIVE FOR TREATING SKIN TO DESTROY EGGS OF ENTEROBIUS VERMICULARIS

Walter Guhl, Haan, and Klaus Bansemir, Langenfeld, both of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Filed Dec. 20, 1988, Ser. No. 287,436
Claims priority, application Fed. Rep. of Germany, Dec. 21, 1987, 3743374
Int. Cl.[5] A61K *31/083, 31/155, 31/045, 31/019*
U.S. Cl. 424—613 19 Claims

1. A method of treating human patients infested with *Enterobius vermicularis*, comprising applying to the skin of such patients an amount, which is effective to kill the eggs of *Enterobius vermicularis* present on such skin within a few minutes of application thereto, of a composition comprising (i) a bis- or oligo-bis-guanide or a water soluble salt thereof, (ii) an alcohol, (iii) hydrogen peroxide or a compound that releases hydrogen peroxide in contact with water, (iv) a carboxylic acid, and (v) water.

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4,942,042

## ANTI-DIARRHEA COMPOSITIONS

Hridaya Bhargava, Sharon, Mass., and Jacques Jutteau, Saint-Cloud, France, assignors to Societe de Conseils de Recherches et d'Applications Scientifiques (S. C. A. S.), France

Continuation of Ser. No. 860,628, May 7, 1986, abandoned. This application Aug. 29, 1988, Ser. No. 239,034
Claims priority, application United Kingdom, May 15, 1985, 8512345
Int. Cl.[5] A61K *31/12, 33/06, 33/14*
U.S. Cl. 424—683 12 Claims

1. A method of treating diarrhea in a human patient comprising administering to said patient diarrhea symptom-reducing amounts of first and second compositions, said first and second compositions being admixed together, or administered separately within thirty minutes of each other,

said first composition comprising a powdered absorptive material capable of absorbing pathogenic intestinal bacteria, said powdered absorptive material being a thermally activated, finely powdered, hydrous magnesium aluminum silicate clay, and

said second composition comprising an oral rehydration salt comprising a sodium salt, a potassium salt, and a sugar,

at least said second composition being administered to said patient admixed with water.

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4,942,043

## SUNFLOWER BASED WILD BIRD FEED

Eugene H. Sander, Hayfield, Minn., assignor to Muscatine Gene's, Inc., Hayfield, Minn.

Continuation-in-part of Ser. No. 126,744, Jan. 13, 1988, abandoned. This application Dec. 14, 1988, Ser. No. 284,325
Int. Cl.[5] A23K *1/00*
U.S. Cl. 426—2 10 Claims

1. A method of feeding wild birds comprising:

coating a sunflower seed portion of less than 4-mesh with a dark coloring substance and a top coat including as a primary ingredient corn gluten meal and tallow in an amount sufficient to form a hydrophobic top coat; and

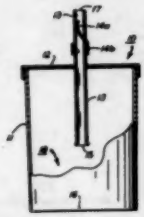
supplying the coated sunflower seed portion to wild birds.

4,942,044

## SPAGHETTI SIPPER

Nicholas A. Ruggieri, 5 Braddock St., Rochester, N.Y. 14612

Division of Ser. No. 245,810, Sep. 19, 1988, Pat. No. 4,891,234.
This application Sep. 25, 1985, Ser. No. 411,840
Int. Cl.[5] B65B *83/00*
U.S. Cl. 426—2 3 Claims



1. A method of consuming by a person prepared pasta products comprising:

(A) placing the prepared pasta product in a device comprising in combination (1) an open ended container, (2) a removable closure for closing the open end of said container, and (3) tubular means for removing said pasta by suction said means being attached to said removable closure, said tubular means being provided with a pawl mechanism so positioned within said tubular means so as to prevent prepared pasta from returning to said container, one end of said pasta being placed in said tubular means and the other end of said pasta being within said container,

(B) placing the person's mouth on the exterior end of said tubular means,

(C) applying suction to said tubular means until the desired amount of pasta is conveyed into the person, and

(D) severing said pasta at exterior end of said tubular means and then the person consuming said pasta.

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4,942,045

## GRAPE JUICE CONCENTRATE

Hermann J. Thumm, Lyndoch, Australia, assignor to Chateau Yaldara Pty. Ltd., Lyndoch, Australia

Filed Oct. 28, 1988, Ser. No. 264,337
Int. Cl.[5] A23L *2/08*; C12G *3/00*
U.S. Cl. 426—11 12 Claims

1. A method of producing a grape juice concentrate comprising:

(a) crushing sound grapes and separating juice from pulp,

(b) subjecting the separated grape juice to a first stage vacuum concentration at a temperature of between 40° C. and 80° C. under vacuum conditions of between 12 and 15 pounds per square inch (84 and 105 kPa), to produce a first stage grape juice concentrate which has a solids content of between 25 and 40 Baume, and a distillate,

(c) transferring the first stage concentrate to a container and storing said concentrate in the container in the presence of alcohol

(d) subsequently separating at least some of said alcohol from the first stage concentrate, subjecting the first stage concentrate to a second stage of vacuum concentration also at a temperature of between 40° C.and 80° C.under vacuum conditions of between 12 and 15 pounds per square inch (84 and 105 kPa) to remove any remaining alcohol and to produce a second stage grape juice concentrate which has a Baume of between 38 and 55, and

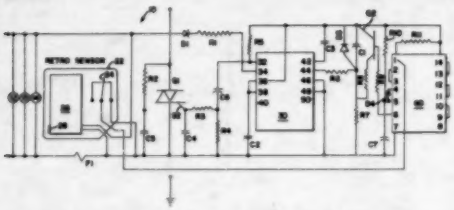
(e) packaging the second stage grape juice concentrate in containers.

4,942,046

## LAMP CONTROL PROCESS FOR WARMING FOOD

Arthur C. Scott, 427 Elm St., Deerfield, Ill. 60015

Filed May 16, 1988, Ser. No. 194,267
Int. Cl.[5] A23C *1/00*
U.S. Cl. 426—233 4 Claims



1. A food warming process, comprising the steps of:
placing at least one plate of cooked food upon a stationary counter in a restaurant;
optically sensing the presence of said plate of cooked food on said stationary counter;
automatically activating at least one heat lamp or heating element above the food when the presence of said plate of cooked food on said stationary counter has been optically sensed;
emitting heat from said lamp or heating element to said food to heat or maintain the temperature of said food above a preselected warming temperature;
removing the plate of food from said stationary counter;
optically sensing the absence of said plate of cooked food on said stationary counter;
progressively and automatically dimming, gradually deenergizing, and sequentially decreasing the intensity of the lamp or heating element for a preselected period of time; and serving the plate of food to a customer.

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4,942,047

## PROCESS FOR PREPARING MARINADED PROTEINACEOUS PRODUCT AND PRODUCT PRODUCED THEREBY

Lawrence L. Buckholz, Jr., Middletown, and Robin Kasper-Lehmann, Elberon, both of N.J., assignors to International Flavors & Fragrances Inc., New York, N.Y.

Continuation-in-part of Ser. No. 371,074, Jun. 26, 1989, abandoned, which is a continuation-in-part of Ser. No. 114,057, Oct. 29, 1987, abandoned. This application Dec. 26, 1989, Ser. No. 457,162
Int. Cl.[5] A23L *1/31, 1/315*
U.S. Cl. 426—302 7 Claims

1. A process for preparing a marinaded chicken meat product consisting of the steps of:
(a) providing a chicken meat muscle tissue inner food core having an outer surface;
(b) preparing a marinade mixture comprising:
(i) an inorganic non-toxic phosphate salt;
(ii) water; and
(iii) a reaction product of macerated chicken meat, cysteine hydrochloride and thiamine hydrochloride;
(c) coating the resulting marinade mixture prepared in (b) onto said outer surface and simultaneously causing the marinade mixture of (b) to be in intimate contact with substantially the entirety of said outer surface for a period of time sufficient to cause said chicken meat muscle tissue inner food core to permanently absorb or adsorb said reaction flavor from the mixture (b); and then
(d) cooking the resulting chicken meat muscle tissue inner core;
the percent marinade based on the total weight of marinaded chicken meat food product being 8%, the percent inorganic non-toxic phosphate salt based on the weight of marinaded chicken meat product being from 0.25% up to 0.35%; the percent reaction flavor being from 1.00% up to 3.20% based on the total weight of marinaded chicken meat food product; the percent water based on the total weight of marinaded chicken meat food product being from 4.55% up to 6.15%.

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4,942,048

## PROCESS FOR PRESERVING FOOD AND DEOXYGENATING COMPOSITION

Yasunobu Nasu, Fuchu; Taichi Ogishima, Akishima; Akira Dei, Tachikawa; Haruhiko Uchida, Musashimurayama; Mitsuru Inami, Takasaki; Tatsuo Furuhashi; Yasuhiko Hino, both of Yono, and Hideo Sugimura, Kita, all of Japan, assignors to Nippon Kayaku Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 22, 1986, Ser. No. 921,689
Claims priority, application Japan, Oct. 29, 1985, 60-242240; Feb. 13, 1986, 61-27860
Int. Cl.[5] A23L *3/34*
U.S. Cl. 426—271 8 Claims

1. A process for preserving food which comprises packing the food in a hermetically sealed container together with: a deoxygenating composition including
(a) at least one deoxygenating material selected from a group consisting of a substantially non-oxidated iron powder and a ferrous compound; and
1 (b) a weakly basic anion exchange resin substituted by a halogen ion
in such a manner that they are not in direct contact with the food.

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4,942,049

## PROCESS FOR CONTROLLING FOAM IN FOOD PROCESSING AND PRODUCTION

Karl H. Schmid, Mettmann; Alfred Meffert, Monheim; Gilbert Schenker, Erkrath, and Adolf Asbeck, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

Filed Jan. 11, 1989, Ser. No. 295,878
Claims priority, application Fed. Rep. of Germany, Jan. 11, 1988, 3800492
Int. Cl.[5] A23L *1/42*
U.S. Cl. 426—329 3 Claims

1. A process for controlling foam in an aqueous food processing or fermentation liquid comprising adding to said aqueous liquid a foam-inhibiting effective amount of a compound of formula I

$$R—O—(CH_2CH_2O)_n—R^1 \quad (I)$$

wherein R is a $C_{20-24}$ alkyl group, $R^1$ is a $C_{1-4}$ alkyl group and n is an integer equal to from 2 to about 10.

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4,942,050

## PROCESS FOR FORMING A MICROWAVE POPCORN PACKAGE

Jon A. Ylvisaker, 1914 Patterson Rd., Marietta, N.Y. 13110

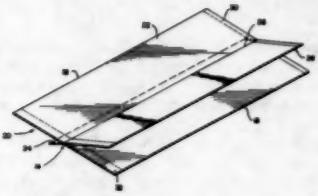
Division of Ser. No. 300,178, Jan. 23, 1989, Pat. No. 4,892,744. This application Oct. 27, 1989, Ser. No. 427,699
Int. Cl.[5] B65B *29/08*
U.S. Cl. 426—394 7 Claims

1. A process for forming a package from a length of microwave energy transparent sheet material, said sheet material forming said package having longitudinally extending opposed marginal edges, said method comprising the steps of:
folding said marginal edges of said sheet material to form two substantially planar opposed faces of said sheet material defining a product-containing chamber and two opposed longitudinally extending fold lines in said sheet material joining the longitudinal periphery of said opposed faces;
forming a longitudinally-extending seam intermediate said fold lines, integral with and projecting away from said one of said faces, outside the plane of said one face, said seam

comprising a seal between said opposed marginal edges such that said edges are sealed to each other in face to face congruent fashion;

forming a longitudinally-extending pleat intermediate said fold lines, integral with and projecting away from said face opposite said one of said faces, outside the plane of said opposite face, said pleat comprising an additional fold line in said sheet material and additional opposed faces and foldable to lie against said opposite face;

forming two opposed transverse seals extending substantially along only the transverse edges of said package to seal an expandable product placed therein, said transverse seals sealing said opposed faces to each other along said transverse edge and sealing said additional opposed faces to each other that constitute said pleat, said sheet material



being otherwise unsealed between said opposed faces and said additional opposed faces and the orientation and configuration of said pleat and said transverse seals being such that when said package is placed in a microwave oven with said pleat folded against said opposite face adjacent the oven floor and microwave energy applied to the package, the expandable product will cause the expansion of said pleat creating a three-surface, generally tubular structure with sealed transverse edges, each surface having one common edge with each of the other surfaces and each surface convexly curved between the sealed transverse edges and between its common edges such that only one of said surfaces of the package contacts said oven floor and makes minimal contact between the package and the microwave oven floor thereby reducing heat transfer from said package to said floor.

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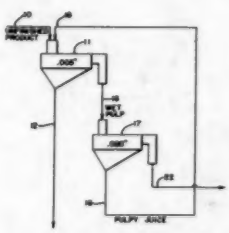
**4,942,051**

## METHOD FOR SEPARATION OF DEFECTS FROM CITRUS JUICE

**Gioacchino Sardisco, Sao Paulo, Brazil, assignor to FMC Corporation, Chicago, Ill.**

**Filed Feb. 2, 1989, Ser. No. 305,126**
**Int. Cl.[5] A23L *2/00***
**U.S. Cl. 426—489** **14 Claims**




1. A method for producing a finished liquid fruit product from a stream of unfinished products comprising the steps of:

pressing the unfinished products in a small screen finisher having a screen size on the order of 0.005" to produce a finished liquid and a wet pulp, said finished liquid containing first size particles smaller than the screen size of the said finisher and said wet pulp containing particles larger than the screen size of the said finisher;

pressing the wet pulp in a coarse screen finisher to produce a pulpy liquid and a dry pulp, said pulpy liquid containing second size particles smaller than the screen size of the said coarse finisher and said dry pulp containing particles larger than the screen size of the said coarse finisher, said second size particles being a predetermined amount substantially larger than said first size particles, and;

recycling the pulpy liquid through the small screen finisher to produce a finished liquid.

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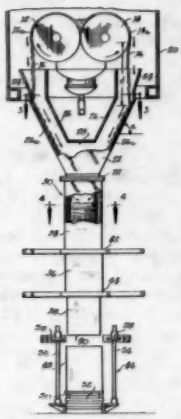
**4,942,052**

## METHOD FOR PRODUCING BLOCKS OF CHEESE CURD

**James R. Posdal, Glenview, Ill., assignor to Kraft, Inc., Glenview, Ill.**

**Filed Nov. 29, 1988, Ser. No. 277,298**
**Int. Cl.[5] A23C *19/00*; B30B *11/00***
**U.S. Cl. 426—512** **5 Claims**



1. A method of forming a block of cheese curd comprising the steps of:

forming a sheet of cheese curd;

collecting said sheet and placing portions of said sheet in a stacked face-to-face relation in a tower so as to superpose stacked portions one on top of another;

applying a vacuum to said stacked portions of said sheet;

pressing said stacked portions of said sheet under the weight of superposed stacked portions to form a pressed curd;

cutting said pressed curd at the bottom of the tower to form a block of cheese curd beneath the overlying superposed portions; and

supporting said superposed portions while lowering said block of cheese curd.

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**4,942,053**

## VACUUM CHILLING FOR PROCESSING MEAT

**Daniel L. Franklin; Arthur J. Goembel, and Douglas D. Hahn, all of Austin, Minn., assignors to Geo. A. Hormel & Company, Austin, Minn.**

**Filed Jul. 19, 1989, Ser. No. 382,105**
**Int. Cl.[5] A23B *4/00***
**U.S. Cl. 426—524** **7 Claims**

1. A process for processing and treating pieces of meat, the meat having water, comprising:

(a) placing the meat in a container having an interior cavity;

(b) creating a vacuum in the interior cavity of the container,

the vacuum being sufficient to lower, in the interior cavity, the temperature at which water boils so that water in the meat boils;

(c) agitating the meat pieces while in the container;

(d) exhausting the water vapor from the interior of the cavity; and

(e) both cooling the massaging the meat pieces by means of the vacuum, wherein cooling is obtained by water boiling from the meat, thereby cooling the meat and massaging is obtained by expanding the meat when exposed to the vacuum and compressing the meat during agitation.

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**4,942,054**

**PROCESS FOR PRODUCING LOW CALORIE FOODS FROM ALKYL GLYCOSIDE FATTY ACID POLYESTERS**

**Daryl B. Winter, Seattle; Richard S. Meyer; Jeffrey M. Root, both of Tacoma, and Michael L. Campbell, Kent, all of Wash., assignors to Curtice-Burns, Inc., Rochester, N.Y.**

**Continuation-in-part of Ser. No. 122,188, Nov. 18, 1987, Pat. No. 4,840,815, which is a continuation-in-part of Ser. No. 49,625, May 13, 1987, abandoned. This application May 3, 1989, Ser. No. 347,264**

**The portion of the term of this patent subsequent to Jun. 20, 2006, has been disclaimed.**

**Int. Cl.[5] A23D *5/00***

**U.S. Cl. 426—611** **30 Claims**

1. In a process for producing a low calorie food containing fat ingredients and nonfat ingredients including the step of substituting a fat substitute for the fat ingredients, the improvement comprising selecting a fat substitute that comprises greater than 10% of an alkyl glycoside fatty acid polyester, the alkyl glycoside fatty acid polyester having at least 4 fatty acid ester groups, wherein each fatty acid independently has from 4 to 24 carbons atoms, and wherein the alkyl glycoside moiety comprises a saccharide portion and an alkyl portion, the alkyl portion having from 1 to 24 carbon atoms.

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**4,942,055**

**GRAVITATIONALLY-STABILIZED PEANUT-CONTAINING COMPOSITION**

**Fitzhugh L. Avera, Alameda, Calif., assignor to PBFB Licensing Corporation, Burnsville, Minn.**

**Continuation-in-part of Ser. No. 116,636, Nov. 3, 1987, Pat. No. 4,832,977, which is a continuation-in-part of Ser. No. 943,681, Dec. 18, 1986, Pat. No. 4,728,526. This application Feb. 28, 1989, Ser. No. 316,989**

**The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.**

**Int. Cl.[5] A23L *1/38***

**U.S. Cl. 426—633** **28 Claims**

1. A gravitationally-stabilized peanut-containing solid or semi-solid composition comprising:

(a) about 60–98% by weight of peanuts;

(b) about 1–10% by weight high melting point (HMP) vegetable oil, said HMP vegetable oil being solid or semi-solid at 20° C.;

(c) about 1–10% by weight of water-soluble, edible polydextrose; and

(d) about 0.5–8% by weight of added water; wherein said polydextrose includes polycarboxylic acid cross-linking agents, wherein said polydextrose is dissolved in said water, and wherein said composition is a gravitationally-stabilized solid or semi-solid mixture at a temperature of about 20° C.

**4,942,056**

**METHOD FOR REPLENISHING A DEPLETED INK SHEET**

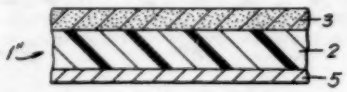
**Hidetsugu Shimura, and Hajime Kurihara, both of Nagano, Japan, assignors to Seiko Epson Corporation, Tokyo, Japan**

**Filed Feb. 17, 1989, Ser. No. 312,000**

**Claims priority, application Japan, Feb. 18, 1988, 63-36114; Feb. 18, 1988, 63-36116**

**Int. Cl.[5] B05D *3/06***

**U.S. Cl. 427—35** **9 Claims**




1. A method for replenishing an ink sheet including a dielectric layer and a conductive ink layer formed on the dielectric layer wherein portions of the ink layer have been removed during transcription to create deleted portions in the ink layer, comprising:

supplying replacement conductive ink material to the ink sheet so that the conductive ink material contacts the depleted portions formed during transcription and contacts the surface of the non-transcribed portions of the ink layer,

providing a base electrode on the opposite surface of the dielectric layer from the ink layer in at least the region of the depleted portions containing the replacement ink material,

imparting an electric charge to the replacement conductive ink material in the depleted portions so that the conductive ink material is retained on the dielectric layer in the region of the depleted portions and the ink material is not attracted to the non-transcribed portions of the ink layer, and

removing the non-attracted ink material.

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**4,942,057**

**MAKING AN AMORPHOUS LAYER**

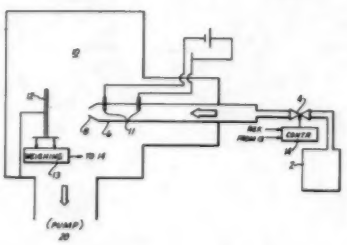
**Juergen Steinwandel, Markdorf; Manfred Hauser, Leonberg, and Joerg Hoeschele, Stuttgart, all of Fed. Rep. of Germany, assignors to Dornier System GmbH, Friedrichshafen, Fed. Rep. of Germany**

**Filed Aug. 14, 1987, Ser. No. 85,854**

**Claims priority, application Fed. Rep. of Germany, Aug. 21, 1986, 3628443**

**Int. Cl.[5] B05D *3/06*; C23C *16/00***

**U.S. Cl. 427—38** **9 Claims**




1. Method of providing and producing a layer on a carrier or on a substrate, the layer to include one or two particular elements, comprising the steps of;

providing a gaseous blend which includes a compound or compounds of said element or elements together with a

carrier gas, the carrier gas being a larger component in the blend;

providing for a decomposition process of said compound such that molecular clusters are formed and are included in and as a result of the decomposition process, the clusters including said element or elements;

accelerating the clusters non-electrically by means of a nozzle into a vacuum chamber to obtain an expansion cone and whereby essentially all acceleration after leaving the nozzle is caused by the nozzle; and

providing a target in the vacuum and in a flow path of the clusters as they emerge from said nozzle to be impinged upon by the clusters as having been accelerated by the nozzle, while a shock wave of carrier gas causes the carrier gas to be decelerated ahead of the target.

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**4,942,058**

## PROCESS FOR FORMING DEPOSITED FILM

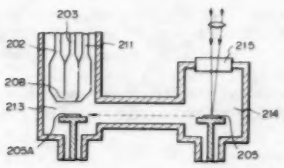
**Masafumi Sano, Nagahama, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 183,484, Apr. 15, 1988, abandoned, which is a continuation of Ser. No. 38,710, Apr. 15, 1987, abandoned. This application Jun. 8, 1989, Ser. No. 363,309**

**Claims priority, application Japan, Apr. 15, 1986, 61-086826**

**Int. Cl.[5] C23C *16/00*; B05D *3/06***

**U.S. Cl. 427—431** **9 Claims**




1. A process for forming a crystalline deposited film on a substrate surface in a film forming space, comprising the steps of:

(a) preparing the surface of said substrate by selectively irradiating the surface thereof with an energy beam of an electromagnetic wave or electron beam through an atmosphere of a gas to provide regions on which crystal nuclei are selectively formed;

(b) forming said crystalline deposited film on said surface of said substrate by separately introducing an activated species (A) formed by decomposition of a compound (SX) containing silicon and a halogen and an activated species (B) formed from a chemical substance (B) for film formation which is chemically mutually reactive with said activated species (A) to form a mixture and effect a chemical reaction therebetween to thereby effect the formation of the crystalline deposited film, said crystalline deposited film having a surface; and

(c) producing an etching action on the crystalline deposited film by exposing the crystalline deposited film surface to a gaseous substance (E) capable of effecting an etching action thereon, and thereby effecting crystal growth in a specific face direction.

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**4,942,059**

## METHOD FOR HARDFACING METAL ARTICLES

**Ian L. W. Wilson, Murrysville, Pa., assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Sep. 29, 1988, Ser. No. 250,659**

**Int. Cl.[5] B05D *3/06***

**U.S. Cl. 427—53.1** **5 Claims**

1. A method for applying a nitrided metal hardface coating on a metal object which comprises applying a coating of an alloy onto a metal object in an atmosphere containing nitrogen under nitriding conditions whereby the coating of the object and nitriding of the coating occur concurrently; said alloy containing 20–75% niobium, 5–35% titanium and 10–60% tungsten.

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**4,942,060**

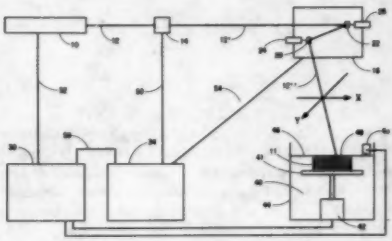
## SOLID IMAGING METHOD UTILIZING PHOTOHARDENABLE COMPOSITIONS OF SELF LIMITING THICKNESS BY PHASE SEPARATION

**Mario Grossa, Dreieich, Fed. Rep. of Germany, assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Apr. 21, 1989, Ser. No. 341,611**

**Int. Cl.[5] B05D *3/06***

**U.S. Cl. 427—54.1** **7 Claims**



1. A method for accurately fabricating an integral three dimensional object from successive layers of a photohardenable liquid composition comprising the steps of:

(a) forming a layer of a photohardenable liquid;

(b) photohardening at least a portion of the layer of photohardenable liquid by exposure to actinic radiation;

(c) introducing a new layer of photohardenable liquid onto the layer previously exposed to actinic radiation; and

(d) photohardening at least a portion of the new liquid layer be exposure to actinic radiation, with the requirement that the photohardenable composition comprises an ethylenically unsaturated monomer, a photoinitiator, and a latent radiation deflecting matter, the latent radiation deflecting matter being in solution within the composition, and separating into separate domains upon photohardening the composition by subjecting it to the actinic radiation, the separate domains comprising a gas,, liquid, solid or mixtures thereof wherein at least a majority of the domains are smaller than the depth of photohardening and larger than one-half of the wavelength of the actinic radiation, the separate domains having a first index of refraction and the rest of the photohardened composition having a second index of refraction, and wherein the absolute value of the difference between the first index of refraction and the second index of refraction is greater than 0.01.

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**4,942,061**

## PROCESS FOR THE PRODUCTION OF ELECTRICALLY INSULATING COATINGS ON METALLIC SURFACES

**Heribert Domes, Wellmünster, Fed. Rep. of Germany, assignor to Stahlwerke Bochum AG, Bochum, Fed. Rep. of Germany**

**PCT No. PCT/DE88/00351, § 371 Date Jan. 26, 1989, § 102(e) Date Jan. 26, 1989, PCT Pub. No. WO88/10288, PCT Pub. Date Dec. 29, 1988**

**PCT Filed Jun. 11, 1988, Ser. No. 306,021**

**Claims priority, application Fed. Rep. of Germany, Jun. 17, 1987, 3720217**

**Int. Cl.[5] C23C *26/00***

**U.S. Cl. 427—104** **17 Claims**

1. The method of forming an electrically insulating coating

on a metallic surface, which comprises applying a film of an aqueous composition which contains

a. a water-dilutable synthetic resin,

b. a dispersed waxlike substance having a particle size between 0.1 and 20 μm and a melting point between 80° and 250° C.,

c. for an inorganic or organic pigment,

d. a borate, and

e. an alkali metal hydroxide, ammonia or an organic amine for adjusting a pH value between 7 to 9, and which is free of fluoride to the metallic surface in a quantity between 0.5 and 20 g/m$^2$, and drying the moist film at a temperature between 120° and 350° for a time between 1 hour and 5 seconds.

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**4,942,062**

**PROCESS FOR PRODUCING BORON CARBIDE COATINGS OF CONTROLLED HARDNESS**

**Michel R. Ducarroir, Odeillo; Germain J. Male, Saillagouse; Marcel F. Nadal, Perpignan; Alain G. Basse; Gérard P. Pizzini, both of Pau, and Didier P. Cazajous, Lanne, all of France, assignors to Coating Development Societe Anonyme, Saint-Etienne, France**

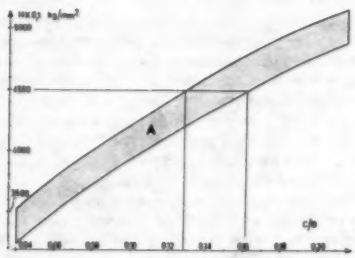
**PCT No. PCT/FR85/00136, § 371 Date Apr. 28, 1986, § 102(e) Date Apr. 28, 1986, PCT Pub. No. WO86/00345, PCT Pub. Date Jan. 16, 1986**

**PCT Filed Jun. 3, 1985, Ser. No. 851,080**

**Claims priority, application France, Jun. 27, 1984, 84 10290**

**Int. Cl.$^5$ C23C *16/32, 16/52***

**U.S. Cl. 427—249** **6 Claims**




1. A process for producing a coating of boron carbide of controlled hardness on a substrate comprising heating the surface of the substrate to a temperature of between 800° C. and 1200° C., reducing a gaseous mixture comprising at least one boron compound and at least one carbide compound in the presence of the heated substrate while causing the reduced gas mixture to flow over the heated surface of the substrate at a total pressure of less than or equal to 100 millibars with an average flow rate of between $10^{-4}$ and $10^{-3}$ g.cm2.5-1, in such a manner as to deposit a coating comprising one or a mixture of phases selected from the group consisting of tetragonal $B_{50}C_2$ and rhombobedral $B_{13}C_2$, establishing a curve of the variation of the hardness of the coating as a function of the composition of the gaseous mixture for conditions of temperature, pressure and flow rate selected, determining the value of the composition corresponding to the hardness of the coating obtained, and adjusting the composition of the gaseous mixture for obtaining a predetermined hardness.

**4,942,063**

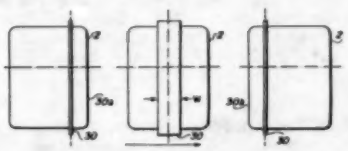
**METHOD FOR CONTROLLING THE THICKNESS DISTRIBUTION OF AN INTERFERENCE FILTER**

**Matthew S. Brennesholtz, Waterloo, and Paul J. Patt, Mount Kisco, both of N.Y., assignors to North American Philips Corporation, New York, N.Y.**

**Filed Apr. 20, 1989, Ser. No. 340,835**

**Int. Cl.$^5$ C23C *16/00***

**U.S. Cl. 427—256** **3 Claims**




1. A method of controlling the thickness distribution of a vapor deposited layer on a moving substrate in the direction of travel of the substrate, the layer formed by vaporizing a source material in the vicinity of the moving substrate, the method comprising the steps of:

(a) providing at least one rotatable dodger between the source material and the path of the substrate;

(b) rotating the dodger about an axis parallel to the plane of the substrate and normal to the direction of travel of the substrate when the substrate is at least partially behind the dodger,

so that during rotation of the dodger the substrate is partially shielded from and partially exposed to the source material.

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**4,942,064**

**METHOD FOR FIXING CHROMATED COPPER ARSENATE TREATING AGENTS IN WOOD**

**Theron R. Brayman, Wadsworth, Ohio; Eugene A. Pasek, Monroeville, and Gregory D. Wall, Apollo, both of Pa., assignors to Hickson Corporation, Conley, Ga.**

**Filed Jun. 21, 1988, Ser. No. 209,512**

**Int. Cl.$^5$ B05D *3/00, 3/10***

**U.S. Cl. 427—297** **12 Claims**

1. A method for fixing chromated copper arsenate agents in wood comprising the steps of impregnating the wood with chromated copper arsenate; and treating the chromated copper arsenate impregnated wood with a fixative agent selected from the group consisting of compounds having the formula

$$R_1-\underset{\underset{R_1}{|}}{N}-\underset{\underset{R_1}{|}}{N}-R_1; \quad \text{(a)}$$

$$NH_2O-R_2; \quad \text{(b)}$$

$$R_2-NHOH; \text{ and} \quad \text{(c)}$$

$$R_3-COOH, \quad \text{(d)}$$

and salts thereof, wherein $R_1$ is the same or different and is selected from the group consisting of hydrogen, phenyl or an alkyl group having 1 to about 4 carbon atoms, $R_2$ is selected from the group consisting of hydrogen and an alkyl group having from 1 to about 4 carbon atoms and $R_3$ selected from the group consisting of $(R_4)_2(HO)C-$ and $R_4OOC-$ wherein $R_4$ is selected from the group consisting of hydrogen, an alkyl group having 1 to about 4 carbon atoms, phenyl and pyridyl.

## 4,942,065
## METHOD FOR CURING SILICONE COATINGS ON PLASTIC SUBSTRATES, AND CURABLE COMPOSITIONS RELATED THERETO

**Arnold Factor, Scotia, and Gautam A. Patel, Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 360,639, Jun. 2, 1989, abandoned, which is a division of Ser. No. 214,964, Jul. 5, 1988, Pat. No. 4,863,520. This application Jan. 16, 1990, Ser. No. 463,830**

**Int. Cl.[5] B05D** *3/02*

**U.S. Cl. 427—387** **19 Claims**

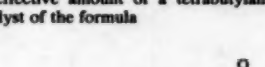
1. A method for forming a protective coating on a plastic substrate, comprising applying to the substrate a curable coating composition which comprises a dispersion of

(I) colloidal silica;

(II) at least one alkyltrialkoxysilane; and

(III) any reaction products of (I) and (II),

in a mixture of water with at least one organic solvent; and curing the coating composition at elevated temperatures with an effective amount of a tetrabutylammonium carboxylate catalyst of the formula



wherein R is selected from the group consisting of hydrogen alkyl groups containing about 1 to about 8 carbon atoms, and aromatic groups containing about 6 to 20 carbon atoms.

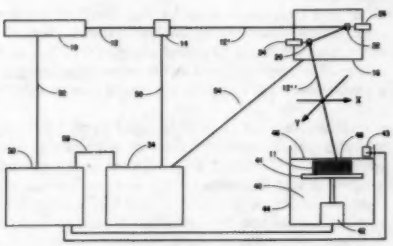
## 4,942,066
## SOLID IMAGING METHOD USING PHOTOHARDENABLE MATERIALS OF SELF LIMITING THICKNESS

**Roxy N. Fan, East Brunswick, N.J., and Mario Grossa, Dreieich, Fed. Rep. of Germany, assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Apr. 21, 1989, Ser. No. 341,612**

**Int. Cl.[5] B05D** *3/06*

**U.S. Cl. 427—54.1** **7 Claims**



1. A method for accurately fabricating an integral three dimensional object from successive layers of a photohardenable liquid composition comprising the steps of:

(a) forming a layer of a photohardenable liquid;

(b) photohardening at least a portion of the layer of photohardenable liquid by exposure to actinic radiation;

(c) introducing a new layer of photohardenable liquid onto the layer previously exposed to actinic radiation; and

(d) photohardening at least a portion of the new liquid layer by exposure to actinic radiation, with the requirement that the photohardenable composition comprises an ethylenically unsaturated monomer, a photoinitiator, and radiation deflecting matter, wherein the deflection matter comprises dispersed particulate solid matter, emulsified liquid or gas, wherein substantially all deflecting matter is smaller than the depth of photohardening and wherein the deflecting matter has a first index of refraction, and the rest of the composition has a second index of refraction, and wherein the difference between the first index of refraction and the second index of refraction increases by more than 0.01 upon subjecting the composition to the radiation in order to selectively photoharden it.

## 4,942,067
## WOOD PRESERVATIVE AND METHOD FOR PRESERVING WOOD

**Norman T. Harding, 713 Wood St., Pittsburgh, Pa. 15221**

**Filed Mar. 27, 1989, Ser. No. 328,688**

**Int. Cl.[5] B05D** *1/18*

**U.S. Cl. 427—393** **3 Claims**

1. A method for preserving wood comprising the steps of

(a) producing a concentrated solution of thujone oil;

(b) heating the wood to be preserved; and

(c) applying the concentrated solution of thujone oil to the heated wood at a pressure approximately in the range of 120 p.s.i. to 2000 p.s.i.

## 4,942,068
## CURTAIN COATING PROCESS

**Wolfgang Schweicher, Leverkusen; Hans Frenken, Odenthal-Oseaau; Heinrich Bussmann, Leverkusen; Kurt Browatzki, Leverkusen, and Johannes Sobel, Leverkusen, all of Fed. Rep. of Germany, assignors to Agfa-Gevaert Aktiengesellschaft, Leverkuse, Fed. Rep. of Germany**

**Filed Jan. 6, 1988, Ser. No. 142,191**

**Claims priority, application Fed. Rep. of Germany, Jan. 13, 1987, 3700727**

**Int. Cl.[5] B05D** *1/30*

**U.S. Cl. 427—420** **9 Claims**

1. A process for the production of a web coated with at least two layers, at least one layer containing binders based on proteins and/or synthetic polymers and another layer, applied as the lowermost or uppermost layer, containing an instant hardener (hardening layer), by the curtain coating method using a V-coater past which the web is continuously guided, characterized in that the hardening layer applied at the same time as the binder-containing layer is guided at the negatively inclined sliding surface of the V-coater while the binder-containing layer is guided at the opposite sliding surface of the V-coater and the hardening layer is combined with the binder-containing layer at the coating edge to form a layer packet which is applied as a free-falling curtain to the web to be coated.

## 4,942,069
## FLAME RETARDANT COMPOSITIONS

**Michael J. Keogh, Bridgewater, N.J., assignor to Union Carbide Chemicals and Plastics Company, Inc., Danbury, Conn.**

**Filed Dec. 7, 1988, Ser. No. 280,979**

**Int. Cl.[5] A01N** *3/00*

**U.S. Cl. 428—389** **10 Claims**

1. A cable comprising a metal core conductor and at least one unfoamed layer surrounding the core consisting essentially of

(i) a thermoplastic polymer;

(ii) a metal hydrate flame retardant compound; and

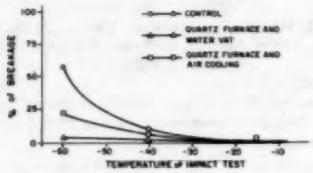
(iii) essentially unreacted blowing agent, which decomposes at a temperature in the range of about 160° C. to the decomposition temperature of the thermoplastic polymer.

**4,942,070**

## EXTRUDED CONDUITS AND METHOD OF MAKING THE SAME

**Jean-Jacques Labaig; Michel Fenie, both of Bernay, and Michel Giotis, Serquigny, all of France, assignors to Atochem, Paris la Defense, France**

**Division of Ser. No. 34,343, Apr. 3, 1987, Pat. No. 4,812,274. This application Dec. 5, 1988, Ser. No. 279,976**
**Claims priority, application France, Apr. 4, 1988, 86 04880**
**Int. Cl.[5] F16L *9/12***
**U.S. Cl. 428—36.9** **2 Claims**




1. An extruded thermoplastic polymer conduit having a conduit wall with a previously oriented surface zone that has been recrystallized by melting and cooling said zone to a crystalline morphology which is identical to the crystalline morphology of the remainder of said conduit wall.

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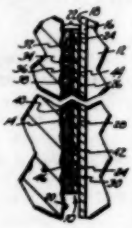
**4,942,071**

## ADHESIVE HOLDING DEVICE WITH SEPARABLE ELEMENTS

**Bruce J. Frye, P.O. Box 483, Milltown, Wis. 54858**

**Filed Oct. 23, 1989, Ser. No. 425,469**
**Int. Cl.[5] B32B *7/06***
**U.S. Cl. 428—40** **12 Claims**



1. An adhesive holding device with separable elements for securing a flat, rogid, back surface of an object to a wall supporting structure which may not be smooth, wherein said holding device includes:

(a) a plurality of coextensive laminates overlying each other;

(b) the laminates including:

(1) a first sheet of plastic material partially defined by opposed, parallel outward and inward surfaces, the outward surface being covered with a pressure sensitive adhesive material adapted to be affixed to the back surface of an object to be secured, and the inward surface being smooth and polished, and of a nature to adhere naturally to another smooth, polished surface,

(2) a relatively thick, resilient, compressible, flat pad partially defined by opposed, nominally parallel, outward and inward surfaces, each such surface being covered with a pressure sensitive adhesive, wherein the inward surface is adapted to be affixed to a surface of a wall supporting structure, and

(3) a second sheet of relatively thin, flexible, effectively non-stretchable material having a smooth and polished outward surface adhered to the inward surface of the first sheet by mutual attraction and having an inward surface captured by the adhesive covering the outward surface of the resilient pad.

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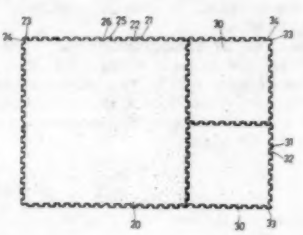
**4,942,072**

## CARPET TILES WITH EDGES PROJECTIONS AND GROOVES

**Farn-Juoh Chung, No. 1, Miao-Pu Lane, Hsiao-Shin Li, Shan-Hua Town, Tainan Hsien, Taiwan**

**Filed May 11, 1989, Ser. No. 350,603**
**Int. Cl.[5] B32B *3/10***
**U.S. Cl. 428—48** **1 Claim**



1. A carpet comprising:

a first set of carpet tiles and a second set of carpet tiles, said first and second sets of carpet tiles being of different sizes and being adapted to interlock with one another;

each of said first carpet tiles being in the form of square with four edges, each edge equalling one unit length, and a first plurality of exposed projections which are equally spaced apart therealong, each of said first projections being in the shape of an isosceles trapezoid with a first parallel side adjacent to said edge of said first carpet tile and a second parallel side having a length which is longer than that of said first parallel side, each side of said first carpet tile further having a first plurality of equally spaced complementary grooves arranged between said first projections so as to interlock with corresponding projections of an adjacent carpet tile;

each of said first carpet tiles having four first protrusions respectively extending from four corners thereof, each first protrusion being of a configuration which is a combination of an trapezoid and an isosceles right triangle with a hypotenuse that overlaps a vertical side of said trapezoid;

said trapezoid having an altitude equal to that of each said isosceles trapezoidal projection; an inclined side which is opposite to said vertical side, adjacent to one of said first grooves of said first carpet tile; a first parallel side, remote from said edge of said first carpet tile, having a length equal to that of said first parallel side of said first projection; and a second parallel side opposite to said first parallel side of said trapezoid which has a length equal to the difference of the length between said second parallel side of said first projection and the length of said altitude of said first projection; one of said first projections being spaced from a side of said isosceles right triangle at a distance equal to the length of said first parallel side of said trapezoid along the edge of said first tile;

each of said second carpet tiles, which are in the form of a rectangle with four edges, each edge of which has a length integrally proportional to that of said first carpet tile; a second plurality of projections and complementary grooves having the same size, configuration and arrangement as those of said first projections and complementary grooves of said first carpet tiles; four second protrusions respectively extending from four corners thereof which have the same size and configuration as those of first protrusions of said first carpet tiles; wherein the improve-

ments lie in the fact that each edge of said second carpet tile has a plurality of trapezoidal teeth each having a notch adjacent thereto, said trapezoidal teeth being spaced apart from one another and said corners of said second carpet tile at a distance equal to said unit length, each of said trapezoidal teeth having an altitude equal to that of said first projection of said first carpet tile; a first parallel side adjacent said edge of said second carpet tile which has a length equal to that of said second parallel side of said second projection; a second parallel side opposite to said first parallel side of said tooth which has a length equal to that of said first parallel side of said second projection; a third side adjacent said second complementary groove of said second carpet tile; and a fourth side which is adjacent said notch of said second carpet tile having a length which is greater than that of said third side of said tooth; each of said notches being in a shape which accommodates that of said tooth so as to interlock with a corresponding projection of a adjacent carpet tile.

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**4,942,073**

## OPTICAL DATA STORAGE MEDIUM

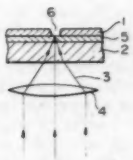
**Susumu Era, Ichihara; Setsuo Kobayashi; Mariko Nakamura, both of Hitachi, and Akio Mukoh, Mito, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 24, 1989, Ser. No. 314,949**

**Claims priority, application Japan, Mar. 9, 1988, 63-53533**

**Int. Cl.[5] B32B *3/02***

**U.S. Cl. 428—64** **13 Claims**




1. An optical data storage medium comprising a resin substrate, a primary coat formed thereon and a recording layer of a dye or dye composition formed on said primary coat which is decomposed or melted by a laser beam, characterized in that the primary coat comprises a silicone resin layer whose surface had been subjected to a plasma treatment.

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**4,942,074**

## CARPET TILE

**Peter W. Bell; David S. Queen, both of Sanquhar, and John B. Smith, Thornhill, all of Great Britain, assignors to Sanquhar Tile Services Limited, Sanquhar, Scotland**

**Continuation of Ser. No. 38,870, Apr. 15, 1987, abandoned, which is a division of Ser. No. 814,260, Dec. 30, 1985, abandoned, which is a continuation of Ser. No. 637,725, Aug. 6, 1984, Pat. No. 4,582,554, which is a continuation of Ser. No. 368,688, Apr. 15, 1982, abandoned, which is a continuation of Ser. No. 163,699, Jun. 27, 1980, abandoned. This application Jun. 6, 1988, Ser. No. 203,308**

**Claims priority, application United Kingdom, Jul. 4, 1979, 7923296**

**Int. Cl.[5] B32B *1/16, 31/00***

**U.S. Cl. 428—95** **9 Claims**

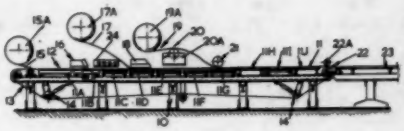
1. A carpet tile product which comprises:

a) a carpet material having a wear surface and an undersurface;

b) a backing layer of solid, hot-melt composition, the backing layer having a one surface and another surface with the one surface bonded to the undersurface of the carpet material;

c) the solid, hot-melt composition selected from the group consisting of atactic polypropylene and bitumen which is liquid at temperatures of greater than about 130° C.;

d) a fabric material embedded within and bonded to the backing layer of the solid hot-melt composition backing layer to provide dimensional stability or resiliency to the carpet tile product; and



e) a backing sheet material composed of a material substantially resistant to penetration of the hot-melt composition in liquid form, and which backing sheet material is bonded to the other surface of the backing layer and wherein the backing sheet is selected from the group consisting of a laminate of glass and polythene; glass-polythene film-glass; a heat-set, non-woven polyester fabric; and paper-polythene film.

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**4,942,075**

## ANNULAR RESILIENT BODY MADE OF FIBER COMPOSITE MATERIALS

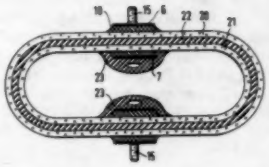
**Volker Härtel, Germering; Carl Heynemann, Taufkirchen; Werner Hundt, Munich; Siegfried Müller, Allershausen, and Matthias Richter, Inning, all of Fed. Rep. of Germany, assignors to Metzeler GmbH, München, Fed. Rep. of Germany**

**Filed Jul. 24, 1989, Ser. No. 384,822**

**Claims priority, application Fed. Rep. of Germany, Jul. 22, 1988, 3825022; Mar. 15, 1989, 3908474**

**Int. Cl.[5] B32B *5/26*; F16F *1/36***

**U.S. Cl. 428—109** **29 Claims**



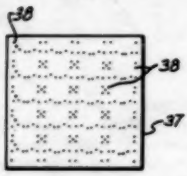
1. Annular resilient body of fiber composite material for vibration-insulating support of drive assemblies, comprising at least one wound body having a circumferential direction and a loading direction, said at least one wound body including a plurality of wound concentric layers formed of synthetic resin impregnated fibers extending in the circumferential direction and transverse to the load direction, and at least one layer of fibers extending at an angle relative to said concentric layers; and force-inducing fastening elements disposed on two opposite sides of said at least one wound body, said fastening elements being formed of metal brackets at least partly encompassing said at least one wound body and elastic rubber layers bracing said metal brackets against said at least one wound body.

4,942,076

## CERAMIC SUBSTRATE WITH METAL FILLED VIA HOLES FOR HYBRID MICROCIRCUITS AND METHOD OF MAKING THE SAME

Ramachandra M. P. Panicker, Camarillo, and Anil K. Agarwal, Poway, both of Calif., assignors to Micro Substrates, Inc., Camarillo, Calif.

Filed Nov. 3, 1988, Ser. No. 266,669
Int. Cl.[5] B32B 3/00
U.S. Cl. 428—137 22 Claims




1. A substrate for a hybrid microcircuit including electronic components, said substrate comprising:

a thin sheet of dimensionally stable electrically insulating material having an upper and lower surface;

a plurality of via holes provided on the upper surface of and extending through the sheet of electrically insulating material; and

a metal filling in each of said via holes, said metal filling comprising a porous mass of sintered refractory metal having a low melting point conductive metal reflowed into the porous mass thereof;

whereby the electronic components of said hybrid microcircuit are mounted over selected ones of the via holes on the upper surface of said sheet of electrically insulating material and use the metal fillings therein to provide a ground connection for and to carry internally generated heat away from the electronic components.

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4,942,077

## TISSUE WEBS HAVING A REGULAR PATTERN OF DENSIFIED AREAS

Greg A. Wendt, Neenah; Kimberly K. Underhill, Appleton; James S. Rugowski, Appleton; Bernhardt E. Kressner, Appleton, all of Wis., and Kai F. Chiu, Brandon, Miss., assignors to Kimberly-Clark Corporation, Neenah, Wis.

Filed May 23, 1989, Ser. No. 355,960
Int. Cl.[5] B32B 5/14
U.S. Cl. 428—152 14 Claims

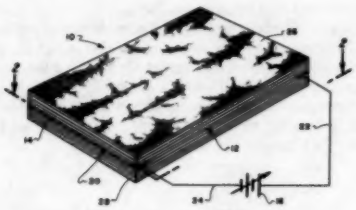
1. A creped tissue web having at least one broken line pattern of individual optically densified areas containing higher mass concentrations of fibers created during the initial formation of the tissue web, said tissue web exhibiting a positive response to the Lunometer Test for at least the machine direction of the tissue web and having a standard deviation for the sine of the crepe angle of 0.18 or less.

4,942,078

## ELECTRICALLY HEATED STRUCTURAL COMPOSITE AND METHOD OF ITS MANUFACTURE

Paul R. Newman, Newbury Park, and Patricia H. Cunningham, Thousand Oaks, both of Calif., assignors to Rockwell International Corporation, El Segundo, Calif.

Filed Sep. 30, 1988, Ser. No. 252,210
Int. Cl.[5] B64D 15/12; H05B 3/10
U.S. Cl. 428—192 9 Claims




1. An electrically conductive structural composite which can be heated by application of an electrical current, comprising:

(a) a plurality of layers of structural fabric which have been treated and prepreged with a laminating resin and cured into a laminate structure, at least one of said layers being a conductive layer of fabric which has been treated with conductive polymer produced by the steps of:

(i) contacting an electrically insulating porous structural fabric with a liquid pyrrole,

(ii) contacting said electrically insulating porous structural fabric with a solution of a strong oxidant capable of oxidizing pyrrole to a pyrrole polymer, and

(iii) oxidizing said pyrrole by said strong oxidant in the presence of a substantially non-nucleophilic anion, and precipitating a conductive pyrrole polymer in the pores of said structural fabric; and

(b) electrical conducting means in electrical contact with said conductive layer for providing passage of electrical current for joule heating of said structural composite.

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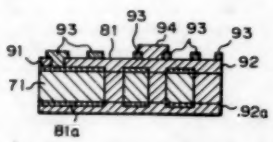
4,942,079

## CERAMIC AND CIRCUIT SUBSTRATE AND ELECTRONIC CIRCUIT SUBSTRATE BY USE THEREOF

Motoo Kumagai, Yokohama; Keiichi Kato, Tokyo; Masato Nagano, and Michiaki Sakaguchi, both of Iwamisawa, all of Japan, assignors to Canon Kabushiki Kaisha and Nippon Oil & Fats Co. Ltd., both of Tokyo, Japan

Filed Jun. 16, 1988, Ser. No. 207,201
Claims priority, application Japan, Jun. 19, 1987, 62-153013
Int. Cl.[5] B32B 3/00
U.S. Cl. 428—209 6 Claims




1. A ceramic comprising therein at least two dielectric regions including (a) a first region having (i) a principal composition consisting of from 49.50–54.00 mole percent of $TiO_2$ and from 50.50–46.00 mole percent of SrO; (ii) from 0.50–5.30 moles $MnO_2$ per 100 moles of the principal composition and (iii) from 0.02–0.40 moles $Y_2O_3$ per 100 moles of said principal

composition; and (b) a second region having (i) a principal composition consisting of from 49.50–54.00 mole percent of $TiO_2$ and from 50.50–46.00 mole percent of SrO; (ii) from 0.50–5.30 moles $MnO_2$ per 100 moles of the principal composition; (iii) from 0.02–0.40 moles $Y_2O_3$ per 100 moles of the principal composition; and (iv) from 0.40–5.00 moles $Al_2O_3$ per 100 moles of said principal composition.

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**4,942,080**

## COMPOSITE MATERIAL FOR VIBRATION DAMPING AND STRUCTURAL SOUND DAMPING

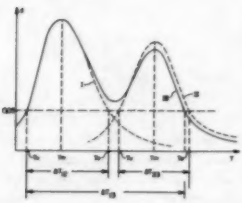
**Wolfgang Heuel, Dortmund; Jobst H. Meyer Zu Bexten, Soest-Ostönnen; Rainer Müller, Unna, and Klaus Stamm, Dortmund, all of Fed. Rep. of Germany, assignors to Hoesch Stahl Aktiengesellschaft, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 152,667, Feb. 5, 1988, abandoned. This application Mar. 6, 1989, Ser. No. 318,838**

**Claims priority, application Fed. Rep. of Germany, Feb. 13, 1987, 3704506**

**Int. Cl.[5] B32B** *7/02, 15/08*

**U.S. Cl. 428—212** **10 Claims**



1. Composite material for vibration damping and structural sound damping in which layers of non-resilient material are bonded together by a viscoelastic intermediate layer, characterized in that the composite material consists of more than two non-resilient (1, 2, 3) layers joined in each case by a viscoelastic intermediate layer (K 12, K 23) and the damping ranges or softening ranges of the viscoelastic intermediate layers (K 12, K 23) lie in different temperature ranges.

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**4,942,081**

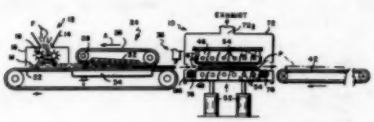
## PROCESS FOR MAKING CELLULOSE-CONTAINING PRODUCTS AND THE PRODUCTS MADE THEREBY

**Haigh M. Reiniger, Boston, Mass., assignor to Altomar-II Trust by Kenneth Safe, Jr., Trustee, Boston, Mass.**

**Filed Jan. 21, 1988, Ser. No. 146,339**

**Int. Cl.[5] B32B** *7/02*

**U.S. Cl. 428—218** **8 Claims**



1. A fusion bonded fiber product made by compressing between heated dies a mat of moisture-containing fibers of the type that change irreversibly to an amorphous nonglassy state that permits fiber-to-fiber bonding at a characteristic critical temperature; stopping the further compression of the partially compacted mat when the mat is a small multiple of the final caliper of the product for a period of time sufficient to vaporize the moisture content of the mat; conducting most of the vaporized moisture content from the interior of the mat as saturated steam through the mat surfaces while the temperature of the mat is still well below said critical temperature, continuing the compression of the mat under continuous consolidation to the final density and caliper of the product while heating the mat to a temperature above said critical temperature; and then removing the heat and pressure from the fully compacted mat followed by releasing same as said product directly into the working space.

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**4,942,082**

## INCOMPATIBLE POLYMER ALLOYS AND LAMINATES THEREOF

**Richard Murphy, North Andover, Mass., assignor to Foss Manufacturing Co., Inc., Haverhill, Mass.**

**Filed Apr. 12, 1985, Ser. No. 722,361**

**Int. Cl.[5] B03D** *3/00*

**U.S. Cl. 428—224** **7 Claims**

1. A stiff laminate comprising an extruded film of a homogeneous alloy of incompatible ionic and non-ionic thermoplastic resins comprising:

At least about 65% weight of an ionic polymer crosslinked at least in part via ionic linking between carboxylic acid groups extending from separate polymeric claims; and,

less than about 35% by weight of a non-ionic thermoplastic resin comprising a polymer of a monomer feed including an olefin having the general formula $RCH{=}CH_2$, wherein R comprises a phenyl radical and at least one layer of a solvent or heat activatable thick solid adhesive layer laminated to at least one side of the alloy film.

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**4,942,083**

## ABRASION RESISTANT COATINGS

**W. Novis Smith, Jr., 412 S. Perth St., Philadelphia, Pa. 19147**

**Filed May 16, 1988, Ser. No. 194,110**

**Int. Cl.[5] B32B** *9/04*

**U.S. Cl. 428—252** **15 Claims**

1. A process for applying and adhering an abrasion resistant silicone or siloxane coating to a metallized substrate comprising applying a primer coating comprising a member selected from the group consisting of phosphoric acid, phosphorous acid, chromic acid and a lanthium salt dissolved in a suitable solvent, heating and then applying said abrasion-resistant coating.

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**4,942,084**

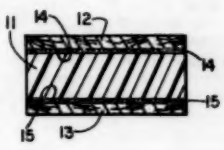
## RECONSTITUTED WOOD VENEER COVERED STRUCTURAL ELEMENTS

**Kendall W. Prince, #50 E. 14th St., Mesa, Ariz. 85201**

**Filed Jun. 30, 1988, Ser. No. 213,336**

**Int. Cl.[5] B32B** *7/12*

**U.S. Cl. 428—284** **16 Claims**




1. A structural element which comprises a structurally stable substrate having a fiber backed reconstituted wood veneer laminated to at least one surface thereof by means of a pressure sensitive adhesive wherein the structural properties of the substrate are not materially affected by the physical properties of the fiber backed reconstituted wood veneer.

4,942,085

## METHOD OF MANUFACTURING A SAG-RESISTANT BONDED PARTICULATE ARTICLE

Gerald J. Guerro, Trumbull, Conn., and Gregory G. Borsinger, Boonton, N.J., assignors to American Cyanamid Company, Stamford, Conn.

Continuation-in-part of Ser. No. 299,284, Jan. 23, 1989, abandoned. This application Nov. 15, 1989, Ser. No. 433,984

Int. Cl.[5] D04H *1/58*

U.S. Cl. 428—288 20 Claims

1. A method of preventing or minimizing humidity-induced sag in bonded particulate substrates comprising applying to at least one side of said particulate substrate a coating composition comprising an aqueous dispersion of a mixture of an effective amount of a glyoxal resin or derivative thereof and an effective amount of a starch compound, and an effective amount of a filler material, and curing said coating composition.

19. A bonded particulate article resistant to humidity-induced sag produced in accordance with the method of claim 1.

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4,942,086

## TWO-STAGE HEAT RESISTANT BINDERS FOR NONWOVENS

Paul R. Mudge, Belle Mead; James J. Walker, Whitehouse Sta., and Ronald Pangrazi, Flemington, all of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Sep. 9, 1988, Ser. No. 242,763

Int. Cl.[5] B05D *3/00*; B32B *11/04, 11/10, 27/30*; E04D *5/02*

U.S. Cl. 428—290 15 Claims

1. A process for preparing a heat resistant nonwoven product comprising the steps of:

(a) impregnating a nonwoven web with an emulsion polymer having a glass transition temperature (Tg) of +10 to +50° C., said polymer being prepared from a two stage polymerization procedure comprising, as a first stage polymer, an ethylene vinyl acetate polymer having a Tg within the range of −10 to +15° C., and a second stage polymer having a Tg of +50 to +120° C., both of said first and second stage polymers containing polymerized therein a pre-crosslinking monomer selected from the group consisting of ethylene glycol diacrylate, 1,3-butylene glycol diacrylate, propylene glycol diacrylate, triethylene glycol dimethacrylate, 1,3-glycerol dimethacrylate, 1,1,1-trimethylol propane dimethacrylate, 1,1,1-trimethylol ethane diacrylate, pentaerythritol trimethacrylate, sorbitol pentamethacrylate, methylenebisacrylamide, methylene bismethacrylamide, divinyl benzene, vinyl methacrylate, vinyl crotonate, vinyl acrylate, divinyl adipate, triallyl cyanurate, triallyl isocyanurate, diallyl phthalate, allyl methacrylate, allyl acrylate, diallyl maleate, diallyl fumarate, diallyl itaconate, diallyl malonate, diallyl carbonate, triallyl citrate, triallyl aconitate, divinyl ether, and ethylene glycol divinyl ether and a post-crosslinking monomer selected from the group consisting of N-alkylolamides of alpha, beta ethylenically unsaturated carboxylic acids having 3–10 carbons, the N-alkylol amides of the vinyl aromatic acids, N-(alkoxyl methyl) acrylates and methacrylates, where the alkyl group has from 1–8 carbon atoms and mixtures of these monomers with allyl carbamate, acrylamide or methacrylamide, with the ratio of the first polymer to the second polymer varying within a range of 6 to 1 to 2 to 1;

(b) removing excess binder;

(c) drying and curing the mat.

15. An asphalt coated roofing membrane comprising a polyester mat impregnated with an emulsion polymer being prepared from a two stage polymerization procedure comprising, as a first stage polymer, an ethylene vinyl acetate polymer having a Tg within the range of −10 to +15° C., and a second stage polymer having a Tg of +50 to +120° C., both of said first and second stage polymers containing polymerized therein a pre-crosslinking monomer selected from the group consisting of ethylene glycol diacrylate, 1,3-butylene glycol diacrylate, propylene glycol diacrylate, triethylene glycol dimethacrylate, 1,3-glycerol dimethacrylate, 1,1,1-trimethylol propane dimethacrylate, 1,1,1-trimethylol ethane diacrylate, pentaerythritol trimethacrylate, sorbitol pentamethacrylate, methylenebisacrylamide, methylene bismethacrylamide, divinyl benzene, vinyl methacrylate, vinyl crotonate, vinyl acrylate, divinyl adipate, triallyl cyanurate, triallyl isocyanurate, diallyl phthalate, allyl methacrylate, allyl acrylate, diallyl maleate, diallyl fumarate, diallyl itaconate, diallyl malonate, diallyl carbonate, triallyl citrate, triallyl aconitate, divinyl ether, and ethylene glycol divinyl ether and a post-crosslinking monomer selected from the group consisting of N-alkylolamides of alpha, beta ethylenically unsaturated carboxylic acids having 3–10 carbons, the N-alkylol amides of the vinyl aromatic acids, N-(alkoxyl methyl)acrylates and methacrylates, where the alkyl group has from 1–8 carbon atoms and mixtures of these monomers with allyl carbamate, acrylamide or methacrylamide, with the ratio of the first polymer to the second polymer varying within a range of 6 to 1 to 2 to 1; the impregnated mat being subsequently coated with asphalt.

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4,942,087

## FILMS OF WHOLLY AROMATIC POLYESTER AND PROCESSES FOR PREPARATION THEREOF

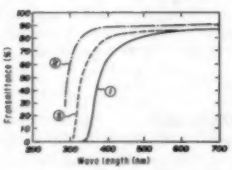
Masanori Motooka; Kazuyuki Takimoto, and Kunisuke Fukui, all of Yamaguchi, Japan, assignors to Mitsui Petrochemical Industries, Ltd., Tokyo, Japan

Filed Dec. 16, 1988, Ser. No. 285,015

Claims priority, application Japan, Dec. 28, 1987, 62-33555; Oct. 26, 1988, 63-270270; Oct. 26, 1988, 63-270271

Int. Cl.[5] C08G *63/02, 69/08*; B32B *27/36*

U.S. Cl. 428—332 3 Claims




1. A film of a liquid crystalline wholly aromatic polyester which is non-oriented and transparent having a thickness of from 1 to 1,000 μm and a transparency of from 60 to 95% wherein said liquid crystalline wholly aromatic polyester consists essentially of:

structural units A derived from at least one aromatic hydroxycarboxylic acid and represented by the formula

$$—OC—Ar^1—O— \quad [I]$$

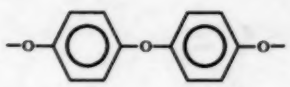
wherein $Ar^1$ is a divalent aromatic hydrocarbon group and at least 60 mol % of $Ar^1$ is p-phenylene;

structural units B derived from at least one aromatic diol and represented by the formula

$$—O—Ar^2—O— \quad [II]$$

wherein $Ar^2$ is a divalent aromatic group selected from the group consisting of p-phenylene, 4,4′-diphenylene and naphthylenes;

structural units C derived from 4,4′-dihydroxydiphenyl ether and represented by the formula



[III]

and

structural units D derived from at least one aromatic dicarboxylic acid and represented by the formula

$$—OC—Ar^3—CO—$$ [IV]

wherein $Ar^3$ is a divalent aromatic group and at least 60 mol % of $Ar^3$ is p-phenylene; in such proportions that the amount of the units A is from 30 to 80 mol %, that of the units B is from 1 to 20 mol %, that of the units C is from 2 to 32 mol % and that of the units D is from 10 to 35 mol %, with the proviso that the sum of moles of the units B and C is substantially equal to moles of units D.

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**4,942,088**

## RECLAIMABLE POLYESTER FILM HAVING ADHESION-PROMOTING COATING

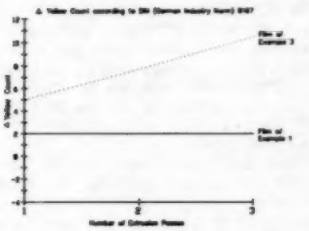
**John D. Gribbin, Schlangenbad; Hermann Dallmann, Wiesbaden; Dieter Engel, Kelsterbach, and Hartmut Hensel, Schlangenbad, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengesellschaft, Frankfurt am Main, Fed. Rep. of Germany**

**Filed Oct. 28, 1987, Ser. No. 113,940**

**Claims priority, application Fed. Rep. of Germany, Nov. 7, 1986, 3637990**

**Int. Cl.**[5] **B32B** *27/08, 27/36;* **C08K** *5/09*

**U.S. Cl. 428—336** **9 Claims**



1. A reclaimable, adhesion-promoting coating composition, suitable for use in the manufacture of coated polyester films, produced by the free-radical emulsion polymerization of the following components:

(A) 1 to 99% by weight of a polymer having carboxy and epoxy functional groups in the form of an aqueous system, produced by reaction of a hydroxy-functional reactant consisting of polyester containing OH groups, and an anhydrous mixture prepared from the conversion of trimellitic acid anhydride with propane-1,2-diol, with;

(B) 1 to 99% by weight of at least one copolymerizable monomer of $\alpha,\beta$-olefinic unsaturation, the percentages each time relating to the total solids content of the components, and

(C) 0.01 to 10% by weight of at least one polymerizable initiator, relative to the monomer content of component (B), and

(D) 0 to 20% by weight of anionic or nonionic emulsifiers or of a mixture of the two or of protective colloids, relative to the monomer proportion of component (B) said polymerization being performed at a temperature between 0° C. and 150° C.

**4,942,089**

## RAPIDLY SHRINKING FIBER AND WATER-ABSORBING SHRINKABLE YARN AND OTHER MATERIALS COMPRISING SAME

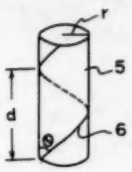
**Tsuneo Genba; Junichi Yoshinaka, and Shingo Nakanishi, all of Okayama, Japan, assignors to Kuraray Company Limited, Okayama, Japan**

**Division of Ser. No. 921,117, Oct. 21, 1986, Pat. No. 4,809,493. This application Dec. 14, 1988, Ser. No. 284,100**

**Claims priority, application Japan, Nov. 1, 1985, 60-246914; Dec. 27, 1985, 60-297942; Jul. 4, 1986, 61-158302**

**Int. Cl.**[5] **D02G** *3/00*

**U.S. Cl. 428—364** **3 Claims**




1. A polyvinyl alcohol fiber capable of rapidly shrinking in the presence of water but hardly soluble in water, said fiber being characterized in that the maximum shrinkage percentage in water at 20° C. is not less than 30%, with the time required for the shrinkage percentage to reach 30% being not longer than 10 seconds, that the shrinkage stress in water at 20° C. as measured in the original length state is not less than 150 mg/dr, with the time required for the shrinkage stress of 150 mg/dr to appear being not longer than 10 seconds, that the shrinkage stress in water at 20° C. as measured in the state of 30% shrinkage relative to the original length is not less than 30 mg/dr and that the weight loss due to dissolution upon dispersion in water at 20° C. is not more than 45%.

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**4,942,090**

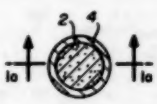
## CHAFF COMPRISING METAL COATED FIBERS

**Louis G. Morin, Tarrytown, N.Y., assignor to American Cyanamid**

**Division of Ser. No. 630,709, Jul. 13, 1984, Pat. No. 4,852,453, Continuation-in-part of Ser. No. 541,611, Oct. 13, 1983, abandoned. This application Apr. 24, 1987, Ser. No. 14,464**

**Int. Cl.**[5] **B32B** *9/00*

**U.S. Cl. 428—367** **26 Claims**




1. Continuous composite fibers, each comprising a semi-metallic core and at least one thin and uniform, firmly adherent, electrically conductive layer of at least one metal on said core, said composite fibers having been chopped into lengths corresponding to the wavelength of one or more radar frequencies.

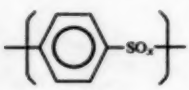
4,942,091

## POLYPHENYLENE SULFONE FIBERS AND A METHOD FOR PRODUCTION THEREOF

Masao Umezawa; Toshio Tsubota, and Shiro Imai, all of Shiga, Japan, assignors to Toray Industries, Inc., Tokyo, Japan

Filed Jul. 25, 1988, Ser. No. 223,353
Int. Cl.[5] D02G 3/00
U.S. Cl. 428—398 6 Claims

1. Polyphenylene sulfone fibers consisting essentially of a polymer composed of individual structural units represented by the formula:



where X is 0, 1 or 2, the average value of X falls within the range of about 1.0 to 2.0 and the molar ratio of $SO_2/SO_x$ is more than 0.3.

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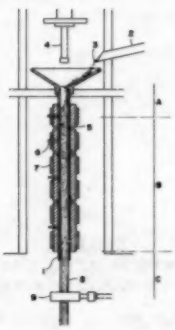
4,942,092

## EXTRUDED POROUS ARTICLES OF POLYIMIDE AND CONTINUOUS PREPARATION OF THE SAME

Seiichirou Takabayashi, Ube, and Masaki Egami, Yokkaichi, both of Japan, assignors to Ube Industries, Ltd., Ube and NTN-Rulon Industries, Ltd., Tokyo, both of, Japan

Continuation of Ser. No. 939,369, Dec. 8, 1986, abandoned. This application Apr. 17, 1989, Ser. No. 339,890
Claims priority, application Japan, Dec. 6, 1985, 60-274613
Int. Cl.[5] B32B 5/16
U.S. Cl. 428—401 8 Claims



1. An extruded porous article comprising an aggregated aromatic polyimide powder having a second order glass transition temperature of 250° to 380° C. which has a heat loss ratio of not more than 2 wt. %, the heat loss ratio being measured at 360° C. for 1 hour, and a mean particle size in the range of 1 to 40 μm, said aromatic polyimide having been prepared by polymerization and imidation of a tetracarboxylic acid component containing not less than 50 mol. % of biphenyltetracarboxylic acid or an acid dianhydride thereof and an aromatic diamine component containing not less than 40 mol. % of 4,4'-diaminodiphenyl ether, the pores of said article being formed by partial fusion of said polyimide powder at a heating temperature of 300° to 500° C. and being distributed essentially uniformly in the article, the porosity of said article being in the range of 5–20%, the porosity % being defined by the formula:

$$\left(1 - \frac{\text{apparent density of article}}{\text{true density of article}}\right) \times 100.$$

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4,942,093

## ADHESIVE SYSTEM FOR BONDING UNCURED RUBBER TO CURED POLYURETHANE

David F. Lawson, Uniontown, Ohio, assignor to Bridgestone/-Firestone, Inc., Akron, Ohio

Filed Sep. 9, 1988, Ser. No. 242,392
Int. Cl.[5] B32B 27/40; C08F 8/30; C08G 18/28
U.S. Cl. 428—423.3 12 Claims

1. An adhesive composition, comprising; a thermosetting polymeric mixture of a bismaleimide compound and an isocyanate terminated rubber polymer, said polymeric mixture comprising from about 10 percent to about 90 percent by weight of bismaleimide based upon the total weight of said bismaleimide compound and said isocyanate terminated rubber copolymer, and from about 10 percent to about 90 percent by weight of said isocyanate-terminated rubber based upon the total weight of said bismaleimide compound and said isocyanate-terminated rubber compound, wherein said rubber polymer is a low molecular weight polymer made from a monoolefin monomer having from 2 to 12 carbon atoms, a diene monomer having from about 4 to 10 carbon atoms, or combinations thereof, and containing from about 1.0 to about 4.0 terminal isocyanate groups on each said rubber polymer molecule, said terminal isocyanate groups adapted to crosslink with said bismaleimide compound upon heating, and the molecular weight of said isocyanate terminated rubber polymer being from about 600 to about 30,000.

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4,942,094

## SILICONE RESIN-MICA LAMINATE AND METHOD OF MANUFACTURING THEREOF

Yoshio Okamura, and Kouichi Tanaka, both of Annaka, Japan, assignors to Shin-Etsu Chemical Co., Ltd., Tokyo, Japan

Filed Jul. 20, 1988, Ser. No. 221,577
Claims priority, application Japan, Jul. 21, 1987, 62-182050
Int. Cl.[5] B32B 19/00, 21/12, 19/04
U.S. Cl. 428—447 5 Claims

1. A silicone resin-mica moisture resistant laminate formed from at least two sheets of laminated mica, which laminate comprises

(i) mica layers formed from mica having a thickness of from about 0.01 mm to about 0.5 mm whose surfaces are coated with

(ii) intermediate layers of a cured mixture of (a) at least one of an amino group-containing alkoxysilane compound and a hydrolyzed derivative thereof and (b) an epoxy group-containing organic silicon compound, in a weight ratio of between 90:10 and 10:90 and with

(iii) silicone resin layer, wherein each neighboring pair of mica and silicone resin layers sandwich an intermediate layer (ii),

said epoxy group-containing organic silicon compound being a siloxane represented by the following formula:

$$R_kR'_mSi(OR'')_nO_{(4-k-m-n)/2}$$

where R is a monovalent organic group having at least one epoxy group, R' and R'' are, respectively, a hydrogen atom or a substituted or unsubstituted monovalent hydrocarbon group and k, m, and n are positive numbers satisfying the inequalities:

$$0.2 \leq k \leq 1$$

$$0 \leq m \leq 3$$

$$2 \leq n \leq 3$$

$2 \leq k+m+n \leq 4$.

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4,942,095

## LAMINATE OF POLYMERS STABLE AT HIGH TEMPERATURES AND METAL FOILS APPLIED DIRECTLY TO THE SAID POLYMERS

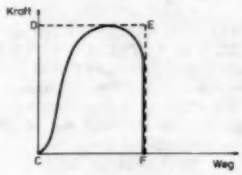
Hermann Buchert, Bad Durkheim; Gerhard Grimm, Altrip, and Helmut Muenstedt, Wachenheim, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany

Filed Nov. 7, 1988, Ser. No. 268,266

Claims priority, application Fed. Rep. of Germany, Nov. 7, 1987, 3737922

Int. Cl.[5] B32B *9/00*

U.S. Cl. 428—461 5 Claims




1. A laminate essentially composed of:

(A) a thermoplastic which is stable at high temperatures and is derived from a material selected from the group consisting of polyarylethersulfones, polyaryletherketones, polyetherimides and thermotropic polymers and

(B) a metallic foil which is applied directly to said polymers and whose surface area has been increased by chemical or mechanical treatment,

the side having an increased surface area facing the thermoplastic which is stable at high temperatures, and the adhesion between the metallic foil (B) and the thermoplastic (A) which is stable at high temperatures being not less than 1.9 N/mm, measured at a peeling speed of 20 mm/min and a peeling angle of 180°, wherein said thermoplastic has a number average molecular weight of 2,000 to 150,000.

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4,942,096

## POLYPROPYLENE RESIN COMPOSITION

Masaru Abe, Osaka; Yoichi Kawai, Kanagawa, and Takashi Miyazaki, Tokyo, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan

Filed Nov. 17, 1989, Ser. No. 437,693

Claims priority, application Japan, Nov. 22, 1988, 63-293466

Int. Cl.[5] C08L *51/06, 23/16;* B32B *27/08, 27/28*

U.S. Cl. 428—476.1 12 Claims

1. A polypropylene resin composition useful as an adhesive comprising

(A) from about 51 wt. % to about 99 wt. % of a modified polypropylene resin graft-modified with a radical-polymerizable polar unsaturated compound or a mixture of said modified polypropylene resin graft-modified with a radical-polymerizable polar unsaturated compound with an unmodified polypropylene resin,

(B) a substantially non-crystalline α-olefin copolymer, and

(C) an ethylene/α-olefin copolymer having a density of from about 0.860 g/cm$^3$ to less than about 0.910 g/cm$^3$, a n-hexane insolubility of at least 50 wt. % and a melting point of at least about is 100° C.,

wherein the weight ratio of (B)/(C) is from about 1/99 to about 99/1.

4,942,097

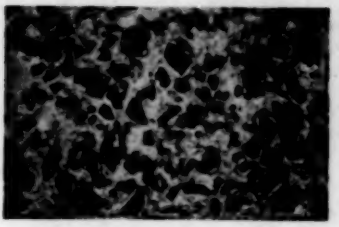
## CERMET CUTTING TOOL

Anakkavur T. Santhanam, Monroeville, and Edward V. Conley, Irwin, both of Pa., assignors to Kennametal Inc., Latrobe, Pa.

Filed Oct. 14, 1987, Ser. No. 108,259

Int. Cl.[5] B22F *5/00*

U.S. Cl. 428—552 24 Claims



1. A cermet cutting tool consisting essentially of:

about 3.5 to about 6.5 w/o nickel;

about 4.5 to about 7.5 w/o cobalt; wherein the sum of nickel+cobalt is between about 8.0 to about 11.0 w/o;

about 20 to about 25 w/o tungsten;

about 5 to about 11.0 w/o molybdenum;

up to about 6 w/o tantalum plus niobium;

up to about 0.05 w/o chromium;

up to about 1 w/o aluminum;

up to about 3 w/o vanadium;

and the remainder being essentially titanium, carbon, and nitrogen, wherein at least substantially all carbon and nitrogen are present as metal compounds selected from the group consisting of metal carbonitrides and mixtures of metal carbides and metal carbonitrides where said metal is selected from the group consisting of tungsten, molybdenum, titanium, tantalum, niobium, vanadium, chromium, and their solid solutions and their mixtures.

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4,942,098

## CORROSION RESISTANT PERMANENT MAGNET

Atsushi Hamamura, Kyoto; Takaki Hamada; Hiroko Nakamura, both of Takatsuki; Tomoyuki Imai, Hiroshima; Toshiki Matsui, Hiroshima, and Nanao Horiishi, Hiroshima, all of Japan, assignors to Sumitomo Special Metals, Co., Ltd., Osaka and Toda Kogyo Corp., Hiroshima, both of, Japan

Filed Mar. 24, 1988, Ser. No. 172,395

Claims priority, application Japan, Mar. 26, 1987, 62-73920; Apr. 13, 1987, 62-90045; Apr. 13, 1987, 62-90046; Apr. 23, 1987, 62-100980; Apr. 23, 1987, 62-100981; Nov. 26, 1987, 62-297975

Int. Cl.[5] B22F *7/04*

U.S. Cl. 428—555 14 Claims

1. A corrosion-resistant permanent magnet comprising a sintered body consisting essentially of 10 to 30 atomic % R wherein R is at least one element selected from the group consisting of Nd, Pr, Dy, Ho and Tb or a mixture of said at least one element and at least one selected from the group consisting of La, Ce, Sm, Gd, Er, Eu, Tm, Yb, Lu and Y, 2 to 28 atomic % B and 65 to 80 atomic % Fe; and having a major phase of a tetragonal crystal structure; the surface of the sin-

tered body being coated with a noble metal film layer consisting essentially of at least one noble metal selected from the group consisting of Pd, Ag, Pt, Au and alloys thereof and a base metal film layer, disposed on said noble metal layer, consisting essentially of at least one base metal selected from the group consisting of Ni, Cu, Sn, Al, Cr, Zn, Co and alloys thereof; said corrosion resistant permanent magnet being characterized by a deterioration rate of the initial magnetic properties thereof being 10% or less after having been kept at a temperature of 80° C. in a relative humidity of 90% for 500 hours.

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4,942,099

## FUEL CELL

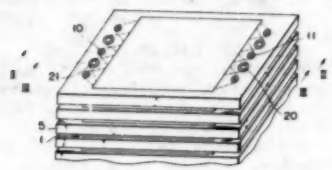
Kenji Isobe, Kawasaki; Michio Hori, Yokohama; Hiroyasu Yoshizawa, Oomiya; Kazuo Ogawa; Hiroyuki Takahashi, both of Yokohama; Mitsuo Noguchi, Zama, and Toshio Maeda, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Filed Nov. 28, 1989, Ser. No. 442,785

Claims priority, application Japan, Nov. 28, 1988, 63-298070; Apr. 14, 1989, 1-93126; Jul. 31, 1989, 1-19824

Int. Cl.[5] H01M *2/08*

U.S. Cl. 429—35 45 Claims




1. A fuel cell comprising:

a plurality of unit cells stacked in layers, each adapted to receive two kinds of gases to generate electrical power;

a plurality of separator elements, each formed of a conductive material and having a peripheral region and a first segment channel penetrating the peripheral region thereof, said separator elements being interposed and electrically connected between the adjacent unit cells to form a stacked structure in which the first segment channels are aligned in the stacking direction; and

a plurality of seal members,

each said seal member including

(a) two annular conductive members,

(b) an electrically insulating annular member interposed between the two conductive members, and

(c) a second segment channel penetrating the two conductive members and the insulating member, said two annular conductive members being joined to the adjacent separator elements so as to communicate the second segment channel with the adjacent first segment channels to define a manifold for the intake and exhaust of the gas into and from the unit cells, thereby preventing the gas in the manifold from leaking out, and insulating the adjacent separator elements.

4,942,100

## ALUMINIUM BATTERIES

John A. Hunter, Banbury; Geoffrey M. Scamans, Cropredy, both of England, and Wilfred B. O'Callaghan, Kingston, Canada, assignors to Alcan International Limited, Montreal, Canada

Filed Aug. 7, 1989, Ser. No. 390,390

Claims priority, application United Kingdom, Aug. 9, 1988, 8818856; Mar. 23, 1989, 8906777

Int. Cl.[5] H01M *10/26*

U.S. Cl. 429—50 14 Claims

1. A high amp-hour aluminium battery comprising a cathode, an alkaline electrolyte and at least one massive aluminium anode plate, characterized in that the electrolyte contains dissolved indium and the anode is an alloy of aluminium with manganese and with one or both of magnesium and calcium, the manganese concentration being effective to improve the corrosion resistance of the anode without causing passivation.

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4,942,101

## ELECTROCHEMICAL CELL HAVING AN ALKALINE ELECTROLYTE AND A ZINC NEGATIVE ELECTRODE

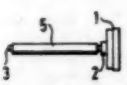
Jean F. Audebert, Val de Reuil, and Daniel Mauchausseè, Amfreville la Campagne, both of France, assignors to CIPEL and WONDER, both of Levallois Perret, France

Filed Jul. 14, 1989, Ser. No. 380,063

Claims priority, application France, Jul. 25, 1988, 88 10014

Int. Cl.[5] H01M *2/26*

U.S. Cl. 429—165 8 Claims




1. An electrochemical cell having an alkaline electrolyte and a gelled negative electrode containing zinc powder free from mercury, from cadmium, and from lead, and having 1 ppm to 1000 ppm of an organic stabilization compound selected from: polyfluoride compounds of the ethoxyl fluoroalcohol type; and compounds of the polyethoxyl alcohol and alkyl sulfide type; said electrode being provided with a nail-shaped cylindrical negative current collector immersed in the gell and passing through a sealing plug and connected to the negative terminal, wherein said current collector is constituted, at least superficially, by a substance selected from: pure zinc, pure cadmium, indium, and gallium; and wherein said nail includes means assembled thereon without melting metal and serving to increase its developed surface area.

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4,942,102

## HOLOGRAPHIC OPTICAL ELEMENTS HAVING A REFLECTION HOLOGRAM FORMED IN A PHOTOPOLYMER

Dalen E. Keys, Wilmington; William K. Smothers, Hockessin, and Albert F. Harrington, Claymont; Jacob Beutel, Hackessin, all of Del.; Scott R. Schicker, Logan, Utah; Dillion F. Scofield, Newark, Del., assignors to E.I. Du Pont de Nemours and Company, Wilmington, Del.

Continuation-in-part of Ser. No. 144,840, Jan. 15, 1988, abandoned. This application Jun. 22, 1989, Ser. No. 370,274

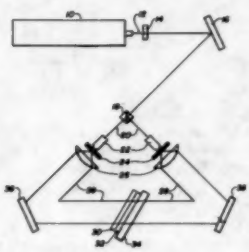
Int. Cl.[5] G03H *1/00*; G03C *1/68*

U.S. Cl. 430—1 69 Claims

1. A holographic optical element comprising a transparent polymeric film containing a reflection hologram, said film having a refractive index modulation greater than approximately 0.001 and being formed by exposing to coherent light a composition consisting essentially of:

(a) approximately 25 to 90% of a polymeric binder selected from the group consisting of polyvinyl acetate, polyvinyl butyral, polyvinyl acetal, polyvinyl formal, interpolymers containing major segments thereof, and mixtures thereof;

(b) approximately 5 to 60% of an ethylenically unsaturated liquid monomer containing at least one phenyl, biphenyl, phenoxy, naphthyl, naphthyloxy, heteroaromatic group containing up to three aromatic rings, chlorine or bromine moiety;



(c) approximately 0 to 25% of a plasticizer; and

(d) approximately 0.1 to 10% of a photoinitiator system activatable by actinic radiation

wherein said percentages are weight percentages based on total film weight.

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**4,942,103**

## SOLID STATE COLOR IMAGING SENSOR HAVING A COLOR FILTER ARRAY

**Raymond F. Reithel, and Richard C. Sutton, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 24, 1988, Ser. No. 212,381**
**Int. Cl.[5] G03C 8/42, 1/66**
**U.S. Cl. 430—7** **4 Claims**

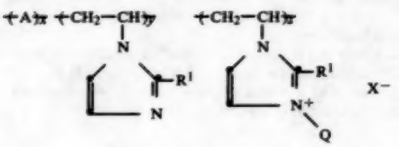
1. A solid state color image sensing device comprising a semiconductive support having a surface comprising an array of light sensing pixels and superimposed thereon in microregistration of color filter array having at least three sets of dyed filter elements characterized in that at least one set of said filter elements is formed from a negativeworking dyeable photoresist composition comprising, in admixturé,

(a) a poly(vinyl alcohol) binder,

(b) a radiation-sensitive dichromate, and

(c) a polymeric mordant comprising recurring units derived from a quaternized N-vinylimidazole

wherein said polymeric mordant contains recurring units:



wherein:

A is a unit derived from an ethylenically unsaturated monomer:

each $R^1$ is independently H or methyl;

Q is alkyl or aryl;

X- is an acid anion;

x is 0 to 65 mole percent;

y is 0 to 95 mole percent; and

z is 5 to 50 mole percent.

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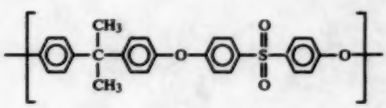
**4,942,104**

## FLEXIBLE ELECTROPHOTOGRAPHIC PHOTOCONDUCTOR HAVING A POLYSULFONE CURL PREVENTION LAYER

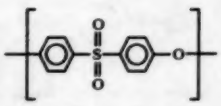
**Ryouichi Kitajima, and Satoshi Otomura, both of Numazu, Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Sep. 16, 1988, Ser. No. 245,281**
**Claims priority, application Japan, Sep. 17, 1987, 62-232893**
**Int. Cl.[5] G03G 5/10**
**U.S. Cl. 430—56** **6 Claims**

1. An electrophotographic photoconductor comprising a flexible film-type substrate, an electroconductive layer formed on a front surface of said substrate, a photoconductive layer formed on said electroconductive layer, and a curl prevention layer formed on the backside of said substrate, opposite to said front surface of said substrate, which curl prevention layer consists essentially of a resin component selected from the group consisting of a resin having a repeating unit of formula (I) and a resin having a repeating unit of formula (II):



(I)



(II)

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**4,942,105**

## ELECTROSTATOGRAPHIC IMAGING SYSTEM

**Robert C. U. Yu, Webster, N.Y., assignor to Xerox Corporation, Stamford, Conn.**

**Filed Jan. 3, 1989, Ser. No. 293,050**
**Int. Cl.[5] G03G 5/14, 13/22**
**U.S. Cl. 430—59** **13 Claims**

1. A flexible electrophotographic imaging member comprising at least one electrophotographic imaging layer, a supporting substrate layer having an electrically conductive surface and an anti-curl layer, said anti-curl layer comprising a film forming binder and from about 3 percent by weight to about 30 percent by weight, based on the total weight of said anti-curl backing layer, of a copolyester resin reaction product of terephthalic acid, isophthalic acid, ethylene glycol and 2,2-dimethyl-1-propane diol, wherein the weight ratio of said terephthalic acid to said isophthalic acid is between about 2:1 to 1:1 and wherein the weight ratio of said ethylene glycol to said 2,2-dimethyl-1-propane diol is between about 2:1 to about 1:1.

9. A flexible electrophotographic imaging member according to claim 1 wherein said electrophotographic imaging layer comprises a charge generating layer and a charge transport layer.

10. A flexible electrophotographic imaging member according to claim 9 wherein said charge transport layer comprises an organic polymer and an aromatic amine compound having the general formula:

wherein $R_1$ and $R_2$ are an aromatic group selected from the group consisting of a substituted or unsubstituted phenyl group, naphthyl group, and polyphenyl group and $R_3$ is selected from the group consisting of a substituted or unsubsti-

tuted aryl group, alkyl group having from 1 to 18 carbon atoms and cycloaliphatic compounds having from 3 to 18 carbon atoms.

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**4,942,106**

## ELECTROPHOTOGRAPHIC PHOTOSENSITIVE MEMBER CONTAINING DISAZO PIGMENT HAVING COUPLER RESIDUE

**Hideyuki Takai, Yokohama, and Tetsuro Kanemaru, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

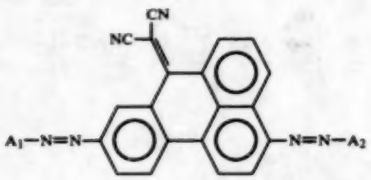
**Filed Dec. 29, 1988, Ser. No. 291,738**

**Claims priority, application Japan, Dec. 30, 1987, 62-335783**

**Int. Cl.[5] G03G 5/06**

**U.S. Cl. 430—72** **8 Claims**

1. An electrophotographic photosensitive member comprising a photosensitive layer on an electroconductive support, characterized in that said photosensitive layer contains a disazo pigment of the formula:



(I)

(wherein $A_1$ and $A_2$, which may be either the same or different, each represent a coupler residue having a phenolic hydroxyl group).

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**4,942,107**

## IMAGE-FORMING MATERIAL AND IMAGE RECORDING METHOD USING THE SAME

**Keiso Saeki; Tosiaki Endo; Masato Satomura, and Fumiaki Shinozaki, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Mar. 8, 1989, Ser. No. 320,734**

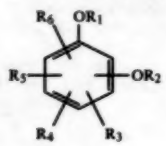
**Claims priority, application Japan, Mar. 8, 1988, 63-54681; Mar. 24, 1988, 63-70354; Mar. 24, 1988, 63-70355; Apr. 1, 1988, 63-80280**

**Int. Cl.[5] G03C 1/72; B41M 1/16**

**U.S. Cl. 430—138** **20 Claims**

1. An image-forming material comprising microcapsules and a reducing agent which is present outside of the microcapsules, wherein the microcapsules contain (a) a leuco dye capable of oxidatively developing a color, (b) a photo-oxidizing agent, and (c) a phenolic compound selected from the group consisting of:

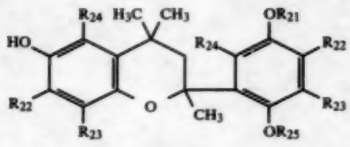
(a) a compound represented by formula (I):



(I)

wherein $R_1$ and $R_2$, which may be the same or different, each represents a hydrogen atom or an alkyl group; $R_3$, $R_4$, $R_5$, and $R_6$, which may be the same or different, each represents a hydrogen atom, an alkyl group, an aryl group, an alkoxy group, an alkylthio group, an acylamino group, a hydroxyl group, or a halogen atom; $OR_1$ or $OR_2$, or both can form a 5- or 6-membered ring with any of $R_3$, $R_4$, $R_5$, and $R_6$ which is at the ortho-position in relation to $OR_1$ or $OR_2$, respectively, and one or more pairs selected from any combination of two of $R_3$, $R_4$, $R_5$ and $R_6$ which are mutually at the ortho-position can form a 5-or 6-membered ring,

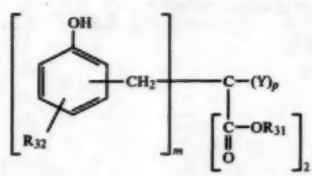
(b) a compound represented by formula (II):



(II)

wherein $R_{21}$ and $R_{25}$ each represents a hydrogen atom, an alkyl group, or a heterocyclic group; and $R_{22}$, $R_{23}$, and $R_{24}$, which may be the same or different, each represents a hydrogen atom, an alkyl group, an aryl group, an alkoxyl group, an aryloxy group, an alkylthio group, an arylthio group, an acylamino group, a diacylamino group, a sulfonamido group, an alkylamino group, an alkoxycarbonyl group, an acyloxy group, or a halogen atom; provided that $R_{21}$ and $R_{25}$ do not simultaneously represent a hydrogen atom,

(c) a compound represented by formula (III):



(III)

wherein $R_{31}$ represents a substituted or unsubstituted 4-piperidyl group; $R_{32}$ represents a hydrogen atom, or one or more substituted or unsubstituted alkyl groups, which may be the same or different, and $R_{32}$ is bonded to the benzene ring; Y represents a hydrogen atom or a substituted or unsubstituted alkyl group; m represents 1 or 2; and p represents 0 or 1; provided that m plus p is 2, and (d) a substituted or unsubstituted o-t-butylphenol compound.

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**4,942,108**

## PROCESS OF MAKING DIAZOQUINONE SENSITIZED POLYAMIC ACID BASED PHOTORESIST COMPOSITIONS HAVING REDUCED DISSOLUTION RATES IN ALKALINE DEVELOPERS

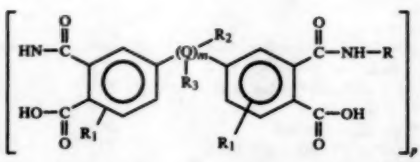
**Wayne M. Moreau, Wappingers Falls; Kaolin N. Chiong, Pleasantville; Ming-Fea Chow, Poughquagh, and Nancy W. Snyder, Newburgh, all of N.Y., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Division of Ser. No. 107,505, Oct. 8, 1987, Pat. No. 4,880,722, which is a continuation-in-part of Ser. No. 804,869, Dec. 5, 1985, abandoned. This application Sep. 8, 1989, Ser. No. 404,700**

**Int. Cl.[5] G03F 7/023; G03C 1/60**

**U.S. Cl. 430—169** **16 Claims**

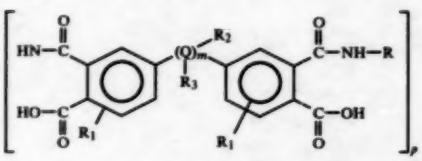
1. A process for forming a resist mask comprising the steps of (1) coating onto a substrate a layer comprising a mixture of polyamic acid material of reduced acidity comprising a polyamic acid having the general formula



wherein Q is C or C=O, R is a divalent aromatic or aliphatic

radical having no active hydrogen, $R_1$ is hydrogen or an alkyl group containing 1 to 3 carbon atoms, and $R_2$ and $R_3$ are independently selected from H, $CH_3$, $C_nH_{2n+1}$ where n is a positive integer, and $CF_3$, m is an integer from 0 to 1 and p is a positive integer, which is reacted or blended to form (a) a polyamic acid material having a level of acidity which is reduced by from about 10 to about 40 percent of the original polyamic acid and (b) a diazoquinone photosensitizer, each of (a) and (b) being present in sufficient quantity to form a photoresist composition which, after radiation exposure and development in alkaline solution, produces a resist image of fine line resolution, (2) image-wise exposing said layer to a source of radiation and then (3) developing said layer in an alkaline developer solution to remove the exposed portion of the layer whereby the exposed photoresist exhibits a reduced dissolution rate in the developer.

9. A method of reducing the dissolution rate of a photoresist composition comprised of a mixture of a polyamic acid and a diazoquinone photosensitizer, which comprises reducing the acidity of a polyamic acid having the general formula



wherein Q is C or C=O, R is a divalent aromatic or aliphatic radical having no active hydrogen, $R_1$ is hydrogen or an alkyl group containing 1 to 3 carbon atoms, and $R_2$ and $R_3$ are independently selected from H, $CH_3$, $C_nH_{2n+1}$ where n is a positive integer, and $CF_3$, m is an integer from 0 to 1 and p is a positive integer, by reacting or blending said polyamic acid to form (a) a polyamic acid material having a level of acidity which is reduced by from about 10 to about 40 percent of the original polyamic acid and mixing (a) with (b) a diazoquinone photosensitizer, each of (a) and (b) being present in sufficient quantity to form a photoresist composition which, after radiation exposure and development in alkaline solution, produces a resist image of fine line resolution.

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**4,942,109**

## LIGHT-SENSITIVE COMPOSITION

**Shigeo Koizumi, and Nobuyuki Kita, both of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Minami-Ashigara, Japan**

**Filed Sep. 7, 1988, Ser. No. 241,374**

**Claims priority, application Japan, Sep. 10, 1987, 62-227492; Sep. 10, 1987, 62-227493**

**Int. Cl.[5] G03C *1/52*; G03F *7/016***

**U.S. Cl. 430—175** **18 Claims**

1. A light-sensitive composition which is developable with an aqueous alkaline solution, comprising at least one light-sensitive resin having an acid value of 15 to 200, which comprises a polymer having at least two photodimerizable unsaturated double bonds adjacent to an aromatic nucleus in the main chain thereof wherein an active mercaptocarboxylic acid is added to a part of the carbon-carbon unsaturated bonds of the polymer, and wherein the active mercaptocarboxylic acid comprises a mercaptocarboxylic acid represented by the formula:

HS—R—COOH

wherein R represents an alkylene group having 1 to 11 carbon atoms.

8. A light-sensitive composition which is developable with an aqueous alkaline solution, comprising (a) at least one light-sensitive resin having an acid value of 15 to 200, comprising a polymer having at least two photodimerizable unsaturated double bonds adjacent to an aromatic nucleus in the main chain thereof wherein an active mercaptocarboxylic acid is added to a part of the carbon-carbon unsaturated bonds of the polymer and (b) at least one negative working diazo resin, and wherein the active mercaptocarboxylic acid comprises a mercaptocarboxylic acid represented by the formula:

HS—R—COOH

wherein R represents an alkylene group having 1 to 11 carbon atoms.

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**4,942,110**

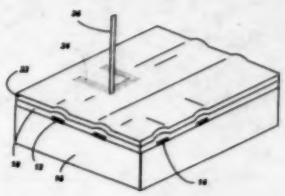
## HIGH RESOLUTION CONDUCTOR PATTERNING

**Frank C. Genovese, and Thomas E. Orlowski, both of Fairport, N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Aug. 29, 1988, Ser. No. 237,804**

**Int. Cl.[5] G03C *11/00*; B05D *3/06***

**U.S. Cl. 430—198** **5 Claims**



1. A method of laser forming a hardened pattern having electrical properties on an uneven surface of a substrate comprising the steps of:

coating the uneven surface of the substrate with a thick film material,

drying the coating to remove organic coating solvents,

generating a pattern on the substrate by scanning a beam of the laser across the coated substrate with enough power to render the generated pattern insoluble to solvent, the laser providing a spot size of less than 50 microns,

applying solvent to the substrate to wash away the excess thick film material, leaving the laser generated pattern, and

firing the substrate to fix the pattern to the substrate.

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**4,942,111**

## PRINTING PLATE PRECURSORS

**John R. Wade, Otley; Jeremy R. Burch, Wilberfoss, and Rodney M. Potts, Adel, all of England, assignors to Vickers PLC, England**

**Continuation of Ser. No. 141,596, Jan. 7, 1988, abandoned. This application Feb. 22, 1990, Ser. No. 484,461**

**Claims priority, application United Kingdom, Jan. 12, 1987, 8700599**

**Int. Cl.[5] G03C *1/76***

**U.S. Cl. 430—273** **8 Claims**

1. A printing plate precursor comprising:

a substrate;

a radiation sensitive layer on the substrate comprising a composition of an ethylenically unsaturated compound and a photoinitiator; and

a barrier layer on said radiation sensitive layer for preventing oxygen inhibition of said radiation sensitive layer, said barrier layer consisting essentially of a first component which is a water soluble transparent polymer having low permeability to oxygen and selected from the group consisting of polyvinyl alcohol, polyacrylamide, polyvinyl pyrrolidone, gum arabic and dextrin and a second component which is an amphoteric polymeric material having basic groups selected from the groups consisting of amine

groups, amide groups, imine groups, hydrazone groups, hydrazine groups, nitrogen containing heterocyclic groups and quaternized forms of such groups and acidic groups selected from carboxylic acid groups, phosphonic acid groups, phosphinic acid groups. phosphate groups, phosphite groups, phosphonate groups, phosphinate groups, sulphonic acid groups, sulphinic acid groups, sulphate groups, and sulphite groups.

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**4,942,112**

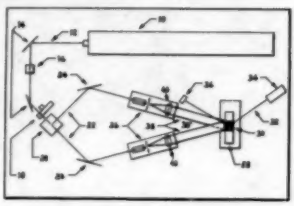
## PHOTOPOLYMERIZABLE COMPOSITIONS AND ELEMENTS FOR REFRACTIVE INDEX IMAGING

**Bruce M. Monroe, Wilmington, and William K. Smothers, Hockessin, both of Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Jan. 15, 1988, Ser. No. 144,355**

**Int. Cl.[5] G03C *1/70, 1/68***

**U.S. Cl. 430—282** **14 Claims**



1. A substantially solid, photopolymerizable composition that forms a refractive-index image upon exposure to actinic radiation as the sole processing step, said composition consisting essentially of, by weight:

(a) 25 to 75% of a solvent soluble, thermoplastic polymeric binder;

(b) 5 to 60% of a mixture of (i) a liquid ethylenically unsaturated monomer, said liquid monomer having a boiling point above 100° C. and being capable of addition polymerization, and (ii) a solid ethylenically unsaturated monomer;

(c) 0.1 to 10% of a photoinitiator system that activates polymerization of said unsaturated monomer upon exposure to actinic radiation;

the composition having a refractive index modulation of at least approximately 0.005 as determined with 632.8 nm radiation from a transmission grating having a spatial frequency of about 1000 lines per millimeter, which transmission grating is prepared holographically from a layer of said composition.

2. The composition of claim 1 wherein the solid ethylenically unsaturated monomer contains a carbazole group.

3. The composition of claim 2 wherein the solid ethylenically unsaturated monomer is selected from the group consisting of N-vinyl carbazole; 3,6-dibromo-9-vinyl carbazole; and mixtures thereof.

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**4,942,113**

## CONTRAST ENHANCED PHOTOLITHOGRAPHY

**Clive Trundle, Silverstone, England, assignor to Plessey Overseas Limited, Essex, England**

**Continuation of Ser. No. 30,414, Mar. 27, 1987, abandoned. This application Mar. 6, 1989, Ser. No. 319,249**

**Claims priority, application United Kingdom, Mar. 27, 1986, 8607715; Jun. 3, 1986, 8613420**

**Int. Cl.[5] G03C *5/00***

**U.S. Cl. 430—326** **18 Claims**

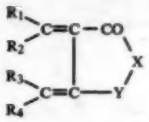
1. A process for producing a developed photoresist having improved resolution by photolithography which comprises the steps of:

(a) forming a photoresist layer on a substrate,

(b) forming a contrast enhancing layer (CEL) directly on the photoresist layer by applying to said photoresist layer a solution or dispersion of a photobleachable, coloured compound in a solvent, followed by heating to form a dry, non-attack superficial layer of a CEL in direct contact with said photoresist, said coloured compound being present in a sufficient amount to render the superficial layer opaque,

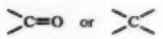
(c) exposing the photoresist through an imaging pattern and through the CEL using radiation which is effective to bleach said compound, and

(d) simultaneously removing the CEL and developing the photoresist using a single developer in which both the CEL and the photoresist are soluble, said photobleachable, coloured compound being selected from a reversible photochromic compound having the general formula (1):



(1)

wherein Y represents



R′ and R″ being hydrogen or alkyl,

X represents oxygen or

in which A is hydrogen or an alkyl or aryl group, and

$R_1$, $R_2$, $R_3$ and $R_4$ represent aryl, alkyl, aralkyl, hydrogen or heterocyclic groups.

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**4,942,114**

## SILVER HALIDE PHOTOGRAPHIC MATERIALS WITH REDUCIBLE BRIGHTENING AGENT RELEASER

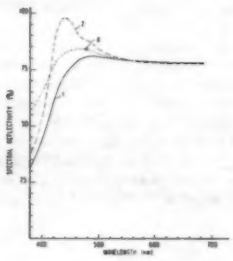
**Keisuke Shiba, and Keizo Koya, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed May 2, 1988, Ser. No. 189,003**

**Claims priority, application Japan, Apr. 30, 1987, 62-106894**

**Int. Cl.[5] G03C *1/40, 1/92***

**U.S. Cl. 430—434** **14 Claims**



14. A method for forming an image in a silver halide photographic material having at least one silver halide emulsion layer on a support, comprising:

providing a silver halide photographic material which contains a compound of formula (I):

$$PWR—(Time)_t—FWA \quad (I)$$

wherein PWR represents a group capable of releasing (Time)$_t$—FWA upon reduction; FWA represents a group which functions as a brightening agent; Time represents a group capable of releasing FWA through a reaction which follows the release of (Time)$_t$—FWA from PWR; and t represents an integer of 0 to 1, wherein said compound of formula (I) does not itself emit or only weakly emits a fluorescent light, and wherein the brightening agent released from the compound of formula (I) strongly emits a fluorescent light,

developing the silver halide after imagewise exposure, and

releasing FWA counter-corresponding to the development of silver halide.

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**4,942,115**

## THERMALLY PROCESSABLE IMAGING ELEMENT COMPRISING AN OVERCOAT LAYER

**Wojciech M. Przezdziecki, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 24, 1989, Ser. No. 342,154**

**Int. Cl.[5] G03C 1/76**

**U.S. Cl. 430—523** **7 Claims**

1. A thermally processable imaging element comprising a support bearing a thermally processable hydrophobic imaging layer and, on the side of the imaging layer away from the support, an overcoat layer comprising poly(silicic acid) and a hydrophilic monomer or polymer, wherein

the element comprises a polymeric adhesion promoting layer between the overcoat and the imaging layer.

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**4,942,116**

## COLOR PHOTOGRAPHIC RECORDING MATERIAL CONTAINING 2-EQUIVALENT MAGENTA COUPLERS

**Günter Renner, Bergisch Gladbach, Fed. Rep. of Germany, assignor to Agfa-Gevaert Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

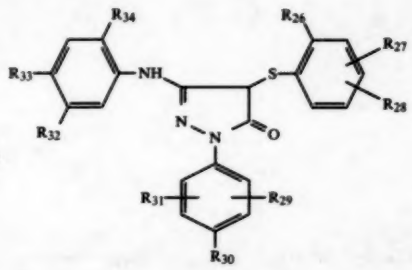
**Filed Jul. 17, 1987, Ser. No. 74,689**

**Claims priority, application Fed. Rep. of Germany, Jul. 29, 1986, 3625816**

**Int. Cl.[5] G03C 7/384**

**U.S. Cl. 430—555** **4 Claims**

1. A color photographic recording material comprising at least one silver halide emulsion layer and at least one layer containing a 2-equivalent magenta coupler corresponding to the following formula



in which

$R_{26}$ is $C_3$–$C_{12}$ alkyl,

$R_{27}$ is $C_3$–$C_9$ alkyl, more especially secondary or tertiary $C_3$–$C_9$ alkyl or chlorine, the total number of carbon atoms in the alkyl radicals $R_{26}$ and $R_{27}$ being from to 16,

$R_{28}$ is hydrogen, chlorine or cyano,

$R_{29}$ is chlorine,

$R_{30}$ is hydrogen, methoxy, chlorine, methyl, cyano or $B_1$,

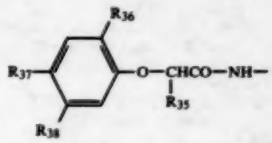
$R_{31}$ is chlorine or methyl,

$R_{32}$ is hydrogen, di-$C_1$–$C_6$-alkylaminocarbonyl, $C_1$–$C_6$-alkylcarbonylamino or $B_1$,

$R_{33}$ is hydrogen or chlorine and

$R_{34}$ is chlorine or methoxy,

either $R_{30}$ or $R_{32}$ having the meaning $B_1$, and $B_1$ is a group of the formula



in which

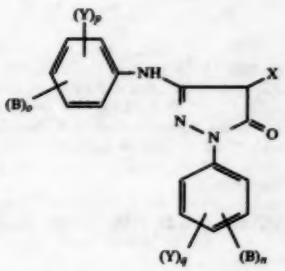
$R_{35}$ is hydrogen or $C_1$–$C_{12}$ alkyl,

$R_{36}$ is hydrogen, $C_1$–$C_8$ alkoxy, hydroxy, $C_1$–$C_8$ alkylcarbonyloxy or $C_1$–$C_8$ alkyl,

$R_{37}$ is hydrogen, hydroxy, or $C_1$–$C_{12}$ alkoxy and

$R_{38}$ is hydrogen or $C_1$–$C_8$ alkyl.

3. A color photographic material comprising at least one silver halide emulsion layer and at least one layer containing a 2-equivalent magenta coupler corresponding to the following formula



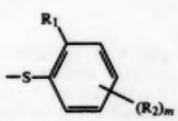
in which

B is a stabilizing group,

selected from the group consisting of groups of mono- and polyols and ethers thereof, sulfamidophenols, secondary or tertiary aromatic amino compounds, and thiophenol derivatives, said stabilizing group being attached through bridge members,

Y is halogen, alkoxy, alkyl, alkylsulfonyl, acylamino, alkoxycarbonyl, aminocarbonyl, amino, trifluoromethyl or cyano,

X is a group corresponding to the following formula



$R_1$ is alkyl containing at least 3 carbon atoms,

$R_2$ is alkyl, halogen, cyano or trifluoromethyl,

m, is 0, 1 or 2,

n, o are each 0 or 1

provided that

n is 1 when o is 0 and

n is 0 or 1 when o is 1;

p is 0, 1, 2 or 3

provided that $p+o \leq 3$,

q is 0 or an integer of up to 5

provided that $q+n \leq 5$,

with the proviso that, where m, p, and/or q have a value of >1, the substituents $R^2$, and Y maybe the same or different.

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**4,942,117**

**PHOTOGRAPHIC SILVER HALIDE MATERIALS AND PROCESS COMPRISING A PYRAZOLOAZOLE COUPLER**

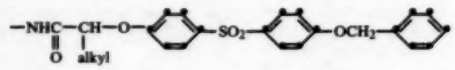
**Sharon E. Normandin, Macedon; Arlyce T. Bowne, Rochester, both of N.Y.; Nigel E. Milner, and David Clarke, both of Watford, Great Britain, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Sep. 26, 1989, Ser. No. 412,722**

**Int. Cl.[5] G03C *7/38***

**U.S. Cl. 430—558** **6 Claims**

1. A photographic element comprising a support bearing at least one photographic silver halide emulsion layer and a pyrazolo[3,2-c]-s-triazole coupler having a 2,4,6-trimethylphenyl group directly bonded in the 3-position of the coupler and a ballast group in the 3- or 5-position of the phenyl group wherein the ballast group is represented by the formula:

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**4,942,118**

**PHOTOGRAPHIC SILVER HALIDE MATERIALS AND PROCESS COMPRISING A PYRAZOLOAZOLE COUPLER**

**Sharon E. Normandin, Macedon; Arlyce T. Bowne, Rochester, both of N.Y.; Nigel E. Milner, and David Clarke, both of Watford, Great Britain, assignors to Eastman Kodak Company, Rochester, N.Y.**

**Continuation of Ser. No. 23,517, Mar. 9, 1987, abandoned. This application Oct. 13, 1988, Ser. No. 257,373**

**Int. Cl.[5] G03C *7/38***

**U.S. Cl. 430—558** **8 Claims**

1. In a photographic element comprising a support, a photographic silver halide emulsion and a dye-forming pyrazoloazole coupler having an aryl or heterocyclic group comprising a carbon atom (A) that is bonded directly to the pyrazoloazole nucleus, the improvement wherein the aryl or heterocyclic group comprises a substituent (B) that is a first alkoxy group in at least one position ortho to the carbon atom (A) and the aryl or heterocyclic group, comprises a second alkoxy group, wherein the substituents (B) enables the maximum absorption of dye formed upon reaction of the pyrazoloazole coupler with an oxidized silver halide color developing agent to be controllably shifted and enables increased dye stability.

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**4,942,119**

**PHOTOSENSITIVE, RADIATION SENSITIVE, THERMALLY SENSITIVE AND PRESSURE SENSITIVE SILVER SODALITE MATERIALS**

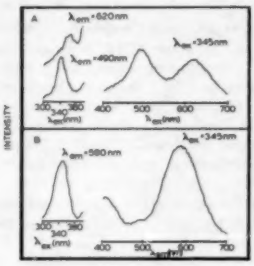
**Geoffrey A. Ozin, 63 Gormerly Avenue, Toronto, Ontario, Canada (M4V 1Y9); John Godber, 179 Mavety Street, Toronto, Ontario, Canada (M6P 2M1), and Andreas Stein, 286 Perth Avenue, Toronto, Ontario, Canada (M6P 3Y2)**

**Filed Aug. 3, 1988, Ser. No. 227,939**

**Int. Cl.[5] G03C *1/02***

**U.S. Cl. 430—564** **17 Claims**

1. A silver sodalite material comprising a radiation senstive silver composition entrapped within the cubooctahedral cavities of the sodalite framework, the silver component thereof being reducible with accompanying alteration of the optical properties thereof, with, the sodalite cavities on irradiation, said composition comprising at least one anion selected from the group consisting of oxalate, hydroxide, azide, carbonate,




bicarbonte, sulfate, sulfite, chlorate, perchlorate, acetate and formate, the anion being in charge association with the silver.

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**4,942,120**

**MODIFIED PEPTIZER TWINNED GRAIN SILVER HALIDE EMULSIONS AND PROCESSES FOR THEIR PREPARATION**

**Scott A. King, Penfield; Philip I. Rose, and Joe E. Maskasky, both of Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 28, 1989, Ser. No. 345,050**

**Int. Cl.[5] G03C *1/02***

**U.S. Cl. 430—567** **21 Claims**

1. a photographic emulsion comprising silver halide grains and a gelatino-peptizer, characterized in that

at least 50 percent of the silver halide grains, based on total grain projected area, contain twin planes and

the gelatino-peptizer contains alkylated methionine.

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**4,942,121**

**SILVER HALIDE PHOTOGRAPHIC LIGHT-SENSITIVE MATERIAL**

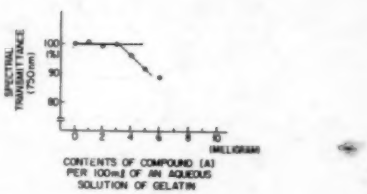
**Makoto Kajiwara; Kaoru Onodera; Toshio Kimura, and Kazuo Komorita, all of Odawara, Japan, assignors to Konishiroku Photo Industry Co., Ltd., Tokyo, Japan**

**Filed Dec. 19, 1985, Ser. No. 811,047**

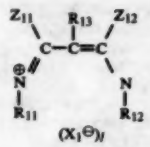
**Claims priority, application Japan, Dec. 24, 1984, 59-272336**

**Int. Cl.[5] G03C *1/16, 1/12***

**U.S. Cl. 430—583** **7 Claims**

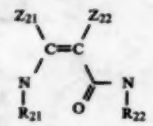



1. A silver halide photographic light-sensitive material comprising a support bearing thereon at least one hydrophilic colloidal layer containing silver halide grains spectrally sensitized with a spectral sensitizer, wherein the spectral sensitizers are selected from those represented by the following Formulas [I] and/or [II] and a hydrophilic colloid forming the hydrophilic colloidal layer contains gelatin whose saturated solubility is not more than 10 in an amount of not less than 35% by weight of the colloid



Formula [I]

wherein $Z_{11}$ and $Z_{12}$ each represent a group of atoms necessary for forming a benzoxazole nucleus, naphthoxazole nucleus, benzothiazole nucleus, naphthothiazole nucleus, benzoselenazole nucleus, naphthoselenazole nucleus, benzoimidazole nucleus, naphthoimidazole nucleus, pyridine nucleus or quinoline nucleus; $R_{11}$ and $R_{12}$ each represent an alkyl group, an alkenyl group or an aryl group; $R_{13}$ represents hydrogen, a methyl group or an ethyl group; $X_1^{\ominus}$ represents an anion; and l represents zero or 1



Formula [II]

wherein $Z_{21}$ represents a group of atoms necessary for forming a benzoxazole nucleus, naphthoxazole nucleus, benzothiazole nucleus, naphthothiazole nucleus, benzoselenazole nucleus, benzoimidazole nucleus or naphthoimidazole nucleus; $Z_{22}$ represents a group of atoms necessary for forming a rhodanine nucleus, 2-thiohydantoine nucleus or 2-thioselenazoline-2,4-dione nucleus; and $R_{21}$ and $R_{22}$ each represent an alkyl group, alkenyl group or aryl group.

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**4,942,122**

## AIDS PROGNOSIS TEST DETECTING THE PRESENCE OF ANTIBODIES INHIBITING HIV REVERSE TRANSCRIPTASE

**David T. Imagawa, Rancho Palos Verdes; Moon H. Lee, Hacienda Heights, and Kouichi Sano, Gardena, all of Calif., assignors to Research Education Institute, Inc., Torrance, Calif.**

**Filed Feb. 24, 1987, Ser. No. 17,450**
**Int. Cl.[5] G01N *33/569***
**U.S. Cl. 435—5** **11 Claims**

1. A method of developing a prognosis for a patient known to be immunopostive for HIV comprising:

contacting a sample of a body fluid of said patient with a solution including HIV reverse transcriptase; primed RNA template; and labeled nucleotide precursor complementary to the primed RNA template;

incubating the resulting mixture for a predetermined length of time;

quantitatively detecting the amount of RNA: poly DNA formed;

making a good prognosis that said patient is unlikely to develop the symptoms of AIDS based on finding an amount of an antibody inhibiting HIV reverse transcriptase, or a poor prognosis that a patient is likely to develop the symptoms of AIDS based on a finding of no antibody inhibiting HIV reverse transcriptase.

**4,942,123**

## PPRB110-PHOSPHOPROTEIN- THE RETINOBLASTOMA SUSCEPTIBILITY GENE PRODUCT

**Wen-Hwa Lee, and Eva Y.-H. P. Lee, both of San Diego, Calif., assignors to The Regents of the University of California, Berkeley, Calif.**

**Filed Sep. 17, 1987, Ser. No. 98,612**
**Int. Cl.[5] C12Q *1/68*; G01N *33/53, 33/567, 33/577***
**U.S. Cl. 435—6** **17 Claims**

1. A method for diagnosing an absence and complete or partial inactivation of the retinoblastoma gene comprising:

(a) obtaining a tissue sample;

(b) labeling the sample with radioactive isotope;

(c) processing the tissue to form a lysate;

(d) reacting a specific anti-ppRB$^{110}$ antibody with the lysated tissue to form a ppRB$^{110}$ antibody immunocomplex;

(e) autoradiographing said complex obtained in step (d);

(f) determining the presence or absence of the ppRB$^{110}$ in the sample by comparing the autoradiogram of step (e) with the autoradiogram of a standard ppRB$^{110}$ protein; and

(g) diagnosing an absence and complete or partial inactivation of the retinoblastoma gene when substantially no measurable ppRB$^{110}$ antibody immunocomplex is formed.

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**4,942,124**

## MULTIPLEX SEQUENCING

**George M. Church, Boston, and Stephen Kieffer-Higgins, Dorchester, both of Mass., assignors to President and Fellows of Harvard College, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 084,623, Aug. 11, 1987. This application Aug. 4, 1988, Ser. No. 228,596**
**Int. Cl.[5] C12Q *1/68***
**U.S. Cl. 435—6** **12 Claims**

1. A method for sequencing a DNA specimen comprising:

(a) providing a set of at least two vectors, each vector of said set comprising a cloning site and including at least one tag sequence at a position within 50 bases of said cloning site, each tag sequence in each vector differing from each tag sequence of every other vector of said set, and each being incapable of hybridizing to said DNA specimen under stringent conditions,

(b) providing a first and a second DNA sequence from said DNA specimen, said first DNA sequence being different from said second DNA sequence,

(c) ligating said first DNA sequence into the cloning site of one of said vectors, and said second DNA sequence into the cloning side of a second of said vectors, thereby producing a plurality of hybrid vectors,

(d) providing a pool of said hybrid vectors,

(e) treating separate aliquots of said pool in a plurality of vessels to produce fragments comprising said tag sequence, wherein said fragments in each vessel differ in length from each other and all terminate at a fixed known base or bases, wherein said fixed known base or bases in one of said vessels differ from said fixed known base or bases in another of said vessels,

(f) separating said fragments comprising tag sequences from each said vessel according to their size,

(g) hybridizing the separated fragments of step (e) under stringent conditions with a first oligonucleotide probe able to hybridize specifically with one of said tag sequences, and

(h) detecting the pattern of hybridization wherein said pattern reflects the nucleotide sequence of said DNA specimen.

4,942,125

## SV40 EXPRESSION VECTOR CONTAINING HBXAG AS AN EXPRESSION MARKER

Ann M. Moriarty, San Diego, Calif., assignor to Scripps Clinic and Research Foundation, La Jolla, Calif.

Continuation-in-part of Ser. No. 648,142, Sep. 7, 1984, and a continuation-in-part of Ser. No. 587,570, Mar. 8, 1984. This application May 26, 1987, Ser. No. 54,424

Int. Cl.[5] C12Q *1/00, 1/70, 21/00, 21/02*

U.S. Cl. 435—7 11 Claims

1. A polypeptide which comprises an antigenic determinant of HBxAg selected from the group consisting of: Gln-Leu-Asp-Pro-Ala-Arg-Asp-Val-Leu-Cys-Leu-Arg-Pro-Val-Gly; Ser-Ala-Val-Pro-Thr-Asp-His-Gly-Ala-His-Leu-Ser-Leu-Arg-Gly-Leu-Pro-Val-Cys; and Met-Glu-Thr-Thr-Val-Asn-Ala-His-Gln-Ile-Leu-Pro-Lys-Val-Leu-His-Lys-Arg-Thr-Leu-Gly, which is capable of reacting with antibodies which are specific to HBxAg, said polypeptide containing no more than about 40 amino acid residues.

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4,942,126

## METHOD OF EXTRACTING ANTIGENS OF BACTERIA

Malcolm Slifkin, Pittsburgh, Pa., assignor to Allegheny-Singer Research Institute, Pittsburgh, Pa.

Filed Aug. 13, 1986, Ser. No. 896,053

Int. Cl.[5] G01N *33/53*

U.S. Cl. 435—7 9 Claims

1. A method of identifying the presence of Campylobacter species in fecal specimens, comprising:

(a) concentrating Campylobacter organisms from fecal specimens using a concentrating media having at least two layers of different densities to segregate the Campylobacter organisms between the layers;

(b) extracting soluble antigens from said Campylobacter organisms; and

(c) reacting said antigens with Campylobacter antisera to yield a detectable agglutinate.

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4,942,127

## POLYREDOX COUPLES IN ANALYTE DETERMINATIONS

Henry G. Wada, Atherton; Harden McConnell, Stanford, and Dean G. Hafeman, Hillsborough, all of Calif., assignors to Molecular Devices Corporation, Palo Alto, Calif.

Filed May 6, 1988, Ser. No. 191,208

Int. Cl.[5] C12Q *1/60*

U.S. Cl. 435—11 7 Claims

1. In a method for determining the presence of an oxidase by means of employing a metal electrode for detection of a redox reaction in an assay medium, the improvement which comprises:

employing for detection in combination:

(1) a tetramethylbenzidine and hydrogen peroxide; with

(2) an iron- or ruthemium-containing ionic redox couple in which said iron is in a coordinated form capable of undergoing one electron transfer and said ruthenium is coordinated with a nitrogen ligand.

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4,942,128

## MICROBIAL CELLULOSE MODIFIED DURING SYNTHESIS

R. Malcolm Brown, Jr., Austin, Tex., assignor to Board of Regents, the University of Texas System, Austin, Tex.

Filed Mar. 6, 1987, Ser. No. 22,904

Int. Cl.[5] C12P *19/04;* C12R *1/02;* B32B *7/00;* C08B *11/193*

U.S. Cl. 435—101 49 Claims

1. A process for producing modified cellulose, the process comprising:

inoculating a quantity of nutrient medium comprising between about 1.0% and about 5.0% polysaccharide derivative with a cellulose-producing microorganism;

aerobically incubating the inoculated medium to produce modified cellulose therein; and

collecting the cellulose.

4,942,129

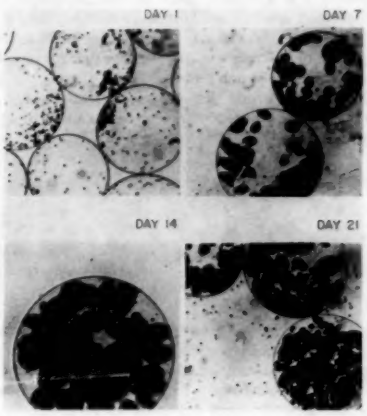
## MULTIPLE MEMBRANE MICROENCAPSULATION

Matheus F. A. Goosen, Kingston; Glenn A. King, Peterborough; Andrew J. Daugulis, and Peter Faulkner, both of Kingston, all of Canada, assignors to Queen's University at Kingston, Kingston, Canada

Continuation-in-part of Ser. No. 78,628, Jul. 28, 1987. This application Jul. 12, 1988, Ser. No. 218,589

Int. Cl.[5] C12N *11/04*

U.S. Cl. 435—182 24 Claims




1. A biocompatible microcapsule, having a diameter of about 400–500 m, comprising:

a macromolecular core material comprising living tissue surrounded by a first biocompatible highly permeable hydrogel membrane consisting of ionically interacted biocompatible materials, having a molecular weight cut-off of about 200–400$\times 10^3$; and said first membrane being interacted with ionically interacted biocompatible materials to form a second relatively less permeable hydrogel membrane having a molecular cut-off of about 40–80$\times 10^3$; said first membrane being sufficiently permeable to permit diffusion therethrough of that portion of a water soluble cross-linkable gelling agent used to suspend said living tissue and having a molecular weight of less than 200–400 $\times 10^3$, and permitting expansion of said microcapsule towards an equilibrium state; and said second membrane being sufficiently permeable to permit nutrients to flow from a medium in which said microcapsule is placed into said microcapsule to sustain said living tissue, and sufficiently impermeable to retain said living tissue and any high molecular weight product thereof within the microcapsule.

7. A method of encapsulating living tissue within two semi permeable hydrogel membranes which comprises:

(a) mixing said living tissue with an aqueous solution of water soluble polymeric material which can be reversibly gelled and which has free acid groups.

(b) forming said mixture into droplets and gelling said droplets in a hardening agent;

(c) forming a first biocompatible highly permeable hydrogel membrane about said first gelled droplets to produce a first microcapsule by reaction with a polymer containing free amino groups; said first membrane having a molecular weight cut-off of 200–400$\times 10^3$;

(d) suspending said first microcapsule in a medium which reliquifies said water soluble polymeric material;

(e) incubating said first microcapsule in an aqueous medium for sufficient time to allow at least one third of that por-

tion of said water soluble polymeric material having a molecular weight of less than $200–400\times10^3$ to diffuse out of said microcapsule, and to allow said microcapsule to expand towards an equilibrium state;

(f) reacting said incubated first microcapsule with a polymer containing positively charged groups to thereby form an interacted relatively less permeable hydrogel membrane having a molecular weight cut-off of $40–80\times10^3$; and

(g) incubating said living tissue within said interacted microcapsule in a nutrient medium; said interacted membrane being sufficiently permeable to permit passage of nutrients and sufficiently impermeable to retain said tissue and any high molecular weight products thereof within said second microcapsule.

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**4,942,130**

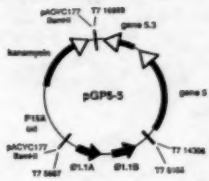
**T7 DNA POLYMERASE**

**Stanley Tabor, Cambridge, and Charles C. Richardson, Chestnut Hill, both of Mass., assignors to President & Fellows of Harvard College, Cambridge, Mass.**

**Continuation-in-part of Ser. No. 3,227, Jan. 14, 1987, Pat. No. 4,795,699. This application Dec. 14, 1987, Ser. No. 132,569**

**Int. Cl. C12N *9/12, 15/00*; C07H *15/12***

**U.S. Cl. 435—194** **27 Claims**




1. A purified modified gene encoding a modified bacteriophage T7-type DNA polymerase wherein said polymerase comprises sufficient DNA polymerase activity for use in DNA sequencing when said polymerase is combined with any host factor necessary for said DNA polymerase activity, and wherein said modified gene modified to reduce the activity of naturally-occurring exonuclease activity of the naturally occurring DNA polymerase.

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**4,942,131**

**MONOCLONAL ANTIBODY AND METHOD FOR PREPARATION OF HYBRIDOMA PRODUCING SAID ANTIBODY**

**Masahiko Yamasaki, Hino; Kiyomi Sunaga, Kawasaki, and Yoshitaka Nagai, Tokyo, all of Japan, assignors to Konica Corporation, Tokyo, Japan**

**Filed Jun. 3, 1988, Ser. No. 202,586**

**Claims priority, application Japan, Jun. 4, 1987, 62-138871**

**Int. Cl.[5] C12P *21/00*; C12N *15/00, 5/00***

**U.S. Cl. 435—240.27** **2 Claims**

1. A monoclonal antibody which recognizes specifically a 4-O-acetyl-N-glycolylneuraminic acid containing sugar chain, said antibody being derived from a hybridoma selected from the group consisting of YHD-08 (ECACC-87060301), YHD-09 (ECACC-87060302), YHD-10 (ECACC-87060303) and YHD-11 (ECACC-87060304).

**4,942,132**

**REAGENT COMPOSITION FOR FECAL OCCULT BLOOD TESTS**

**Paul J. Lawrence, Campbell, Calif., assignor to Litmus Concepts, Inc., Santa Clara, Calif.**

**Division of Ser. No. 869,573, Jun. 2, 1986, abandoned, which is a continuation-in-part of Ser. No. 680,357, Dec. 11, 1984, Pat. No. 4,615,982, which is a continuation-in-part of Ser. No. 502,446, Dec. 10, 1985. This application Mar. 28, 1988, Ser. No. 175,738**

**Int. Cl.[5] G01N *21/78, 33/72*; C12Q *1/28***

**U.S. Cl. 436—66** **34 Claims**

1. A complete reagent composition for use in a fecal occult blood test comprising a solution of a leuco dye and a hydroperoxide in a solvent containing at least about 50% by volume of a solvent for iron protoporphyrins, wherein said solvent for iron protoporphyrins is a mixture of a neutralized amine and an organic co-solvent, wherein the neutralized amine is selected from the group consisting of ethanolamine, 2-(diethylamino)ethylamine, and diethanolamine.

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**4,942,133**

**PROCEDURE FOR THE CONTINUOUS ANALYSIS OF THE CHLORIDE IONS PRESENT IN THE OVERHEAD WATERS OF A HYDROCARBON DISTILLATION COLUMN**

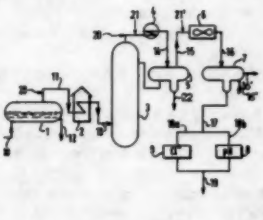
**Jean-Francois Pauly, Le Havre, and Gerard Roussel, Goderville, both of France, assignors to Compagnie de Raffinage et de Distribution, Perret, France**

**Filed Dec. 21, 1988, Ser. No. 288,026**

**Claims priority, application France, Dec. 21, 1987, 87 17821**

**Int. Cl.[5] G01N *27/26***

**U.S. Cl. 436—125** **16 Claims**



1. A procedure for the continuous analysis of overhead waters for the content of chloride ions present in a hydrocarbon distillation column, which procedure comprises the following steps:

drawing a sample of at least a part of the overhead waters for analysis;

removing hydrocarbons and suspended matter from at least a portion of the sampled waters to yield a partially purified sampling;

blowing nitrogen into the partially purified sampling to remove hydrogen sulfide and residual hydrocarbons;

oxidizing $S^{2-}$ or $HS^-$ sulfide ions in the sampling to sulfate ions;

acidifying the sampling to result in a pH appropriate for obtaining stable ionometry results; and

finally, measuring by ionometry the content of chloride ions present in the partially purified sampling that is oxidized and acidified;

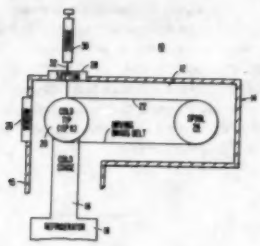
the steps between sampling and measuring may be in any order.

**4,942,134**

## METHOD AND APPARATUS FOR SCIENTIFIC ANALYSIS UNDER LOW TEMPERATURE VACUUM CONDITIONS

**James D. Winefordner, and Bradley T. Jones, both of Gainesville, Fla., assignors to The University of Florida, Gainesville, Fla.**

**Filed Feb. 19, 1988, Ser. No. 157,788**
**Int. Cl.[5] G01N *1/00, 21/00, 30/62***
**U.S. Cl. 436—161** **23 Claims**



1. A method of scientific analysis of a sample under low temperature vacuum conditions, the steps comprising:

evacuating a vacuum chamber;

cooling a cooling means within the vacuum chamber;

transferring the sample from outside of a vacuum chamber to a sample holding means inside of the vacuum chamber while the vacuum chamber is at vacuum and the cooling means is at low temperature;

cooling the sample by having the cooling means cool the sample holding means;

analyzing the sample when it has reached a given low temperature; and

after the analyzing step is complete, warming the sample such that it evaporates from the sample holding means so as to clean the sample holding means, the cooling means remaining at low temperature during the warming step wherein said warming step is accomplished by separating at least a portion of the sample holding means from the cooling means.

11. An apparatus for placing a sample under low temperature vacuum conditions for scientific analysis comprising:

a vacuum chamber having an entrance port;

a cooling means within the vacuum chamber; a sample holding means within the vacuum chamber and disposed such that the cooling means will cool a sample on said sample holding means to a given low temperature for analysis; and

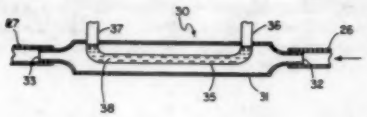
wherein said entrance port is operable to allow the transfer of a sample from outside said vacuum chamber to said sample holding means inside of said vacuum chamber while the vacuum chamber remains at vacuum and said cooling means is at low temperature, and wherein said apparatus is operable to cause the evaporation of the sample from said sample holding means so as to clean said sample holding means while the vacuum chamber remains at vacuum and said cooling means is at operational low temperature wherein said sample holding means is a conveyor belt having a cool end adjacent to said cooling means and a warm end removed from said cooling means.

**4,942,135**

## METHOD FOR PRECONCENTRATING A SAMPLE FOR SUBSEQUENT ANALYSIS

**Solomon Zaromb, Hinsdale, Ill., assignor to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Division of Ser. No. 892,990, Aug. 4, 1986, Pat. No. 4,829,008.**
**This application Apr. 14, 1989, Ser. No. 337,983**
**Int. Cl.[5] G01N *1/18***
**U.S. Cl. 436—178** **14 Claims**




1. A method for preconcentrating traces of contaminants in a gaseous medium for subsequent analysis, said method comprising the steps of:

passing a sample of the gaseous medium through a sorbing device having a gas-impermeable outer container and a gas-permeable inner container disposed therein, whereby the gaseous medium is passed through said outer container and around said inner container, said inner container containing contaminant-sorbing material for trapping and preconcentrating traces of contaminants in the gaseous medium in the sorbing material, and then removing the preconcentrated traces of contaminants from the sorbing device in a fluid sample for injection into an analytical instrument.

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**4,942,136**

## METHOD FOR PRODUCTION OF FLUORESCENCE-LABELED FAB'

**Shohei Konishi; Akira Imai, both of Yokkaichi; Goro Wakabayashi, Suzuka, and Hiroshi Kishioka, Yokkaichi, all of Japan, assignors to Agency of Industrial Science and Technology and Ministry of International Trade and Industry, Tokyo, Japan**

**Filed Mar. 30, 1988, Ser. No. 175,289**
**Claims priority, application Japan, Jul. 29, 1987, 62-187648**
**Int. Cl.[5] G01N *33/563***
**U.S. Cl. 436—512** **13 Claims**

1. A method for producing fluorescence-labeled Fab' molecules, comprising the steps of:

(i) reacting a label substance with Fab' molecules, wherein said label substance is a fluorescent molecule or a molecule which, when bound to the -SH group of said Fab', is fluorescent, thereby obtaining a mixture of unreacted Fab' molecules and fluorescence-labeled Fab' molecules in which said fluorescent label is bound to the thiol group of said Fab' molecule;

(ii) transforming said unreacted Fab' molecules in said mixture to $F(ab')_2$ molecules; and

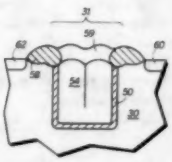
(iii) separating said fluorescent-labeled Fab' molecules from said mixture by using the difference in molecular weight between said fluorescence-labeled Fab' molecules and said $F(ab')_2$ molecules.

4,942,137

## SELF-ALIGNED TRENCH WITH SELECTIVE TRENCH FILL

Richard D. Sivan; James R. Pfiester, and John E. Leiss, all of Austin, Tex., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Aug. 14, 1989, Ser. No. 393,210
Int. Cl.[5] H01L 21/76
U.S. Cl. 437—63 19 Claims



1. A method for fabricating an integrated circuit trench structure, comprising the steps of:

providing a substrate having a surface;

forming a masking layer over said substrate surface;

forming an opening in said masking layer overlying said substrate surface, said opening bounded by a vertical surface and exposing a portion of said substrate surface;

forming a sidewall spacer on said vertical surface, said sidewall spacer covering an edge portion of said exposed substrate surface and leaving exposed a central portion of said exposed substrate surface;

etching a trench in said exposed central portion of said exposed substrate surface, using said sidewall spacer as an etch mask, said trench having a wall surface and a bottom surface, said wall surface being self-aligned with said sidewall spacers;

depositing a material into and substantially filling said trench;

removing said sidewall spacers to expose said edge portion of said exposed substrate surface;

thermally oxidizing said edge portion to form an insulating region overlying said edge portion of said exposed substrate surface and surrounding said central portion of said exposed substrate surface; and

removing said masking layer.

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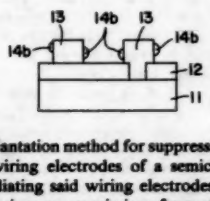
4,942,138

## ION-IMPLANTATION OF WIRING ELECTRODES OF A SEMICONDUCTOR DEVICE FOR HILLOCK REDUCTION

Kazumi Miki, Nara, Japan, assignor to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Dec. 23, 1988, Ser. No. 290,039
Claims priority, application Japan, Dec. 26, 1987, 62-332246
Int. Cl.[5] H01L 21/265, 21/28
U.S. Cl. 437—182 3 Claims



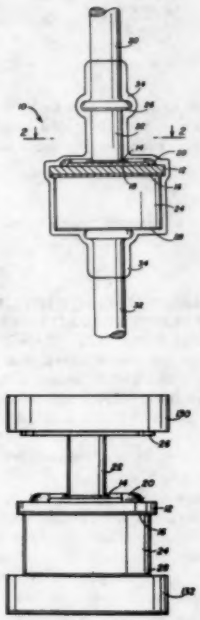
1. An ion-implantation method for suppressing the formation of hillocks in wiring electrodes of a semiconductor device comprising irradiating said wiring electrodes with ion beams containing argon ions or arsenic ions from at least two directions which are inclined with respect to the direction normal to the top surface of said wiring electrodes.

4,942,139

## METHOD OF FABRICATING A BRAZED GLASS PRE-PASSIVATED CHIP RECTIFIER

Michael Korwin-Pawlowski, Ft. Salonga, N.Y., assignor to General Instrument Corporation, New York, N.Y.

Filed Feb. 1, 1988, Ser. No. 151,066
Int. Cl.[5] H01L 3/00
U.S. Cl. 437—209 19 Claims



1. A method of fabricating a semiconductor device, comprising making a p-n junction by diffusion into a semiconductor wafer, patterning the wafer to delineate at least one die with an exposed p-n junction area, applying glass to the exposed p-n junction area of the semiconductor die, and applying a contact member to a surface of the semiconductor die by brazing the contact to the die with an intermediate metalization layer having a melting point above 575° C.

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4,942,140

## METHOD OF PACKAGING SEMICONDUCTOR DEVICE

Hideaki Ootsuki; Mitsuyuki Takada; Toru Kokogawa, and Hayato Takasago, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan

Continuation-in-part of Ser. No. 171,448, Mar. 21, 1988, abandoned. This application Jun. 9, 1989, Ser. No. 363,710
Claims priority, application Japan, Mar. 25, 1987, 62-72245; Mar. 25, 1987, 62-72246
Int. Cl.[5] H01L 21/60, 21/603, 21/56
U.S. Cl. 437—211 24 Claims

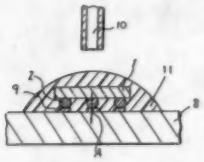
1. A method of packaging a semiconductor device comprising:

positioning a semiconductor device and a mounting body with the electrodes of said semiconductor device and the leads of said mounting body in slidable mechanical contact with each other, said electrodes not being bonded to said leads;

applying a settable electrically insulating resin that shrinks upon setting, covering the portions of said unbonded

electrodes and leads that are in contact with each other; and

setting said insulating resin while keeping said electrodes



and said leads in contact with each other to fix said electrodes to said leads whereby said resin, when set, applies a compressive force between said electrodes and said leads.

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**4,942,141**

**INFRARED ABSORBING SQUARYLIUM DYES FOR DYE-DONOR ELEMENT USED IN LASER-INDUCED THERMAL DYE TRANSFER**

**Charles D. DeBoer, and Steven Evans, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 16, 1989, Ser. No. 366,952**

**Int. Cl.[5] B41M *5/035, 5/26***

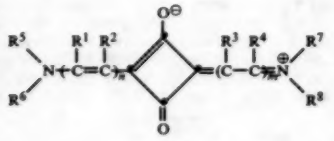
**U.S. Cl. 503—227** **17 Claims**

7. In a process of forming a laser-induced thermal dye transfer image comprising

(a) imagewise-heating by means of a laser a dye-donor element comprising a support having thereon a dye layer and an infrared-absorbing material which is different from the dye in said dye layer, and

(b) transferring a dye image to a dye-receiving element to form said laser-induced thermal dye transfer image,

the improvement wherein said infrared-absorbing material is a squarylium dye which is located in said dye layer and has the following formula:



wherein:

$R^1$, $R^2$, $R^3$ and $R^4$ each independently represents hydrogen, hydroxy, halogen, cyano, alkoxy, aryloxy, acyloxy, aryloxycarbonyl, alkoxycarbonyl, sulfonyl, carbamoyl, acyl, acylamido, alkylamino, arylamino or a substituted or unsubstituted alkyl, aryl or hetaryl group;

or any of said $R^1$, $R^2$, $R^3$ or $R^4$ groups may be combined with $R^5$, $R^6$, $R^7$ or $R^8$ or with each other to form a 5- to 7-membered substituted or unsubstituted carbocyclic or heterocyclic ring;

$R^5$, $R^6$, $R^7$ and $R^8$ each independently represents hydrogen, a substituted or unsubstituted alkyl or cycloalkyl group having from 1 to about 6 carbon atoms or an aryl or hetaryl group having from about 5 to about 10 atoms;

or $R^5$ and $R^6$ or $R^7$ and $R^8$ may be joined together to form a 5- to 7-membered substituted or unsubstituted nitrogen-containing heterocyclic ring; and

n and m are each independently 1 to 4.

**4,942,142**

**SUPERCONDUCTING THIN FILM AND A METHOD FOR PREPARING THE SAME**

**Hideo Itozaki; Saburo Tanaka; Nobuhiko Fujita; Shuji Yazu, and Tetsuji Jodai, all of Hyogo, Japan, assignors to Sumitomo Electric Industries Ltd., Osaka, Japan**

**Filed Jul. 27, 1988, Ser. No. 224,699**

**Claims priority, application Japan, Jul. 27, 1987, 62-186812**

**Int. Cl.[5] B32B *9/00***

**U.S. Cl. 505—1** **12 Claims**

1. A superconducting thin film composed of high temperature compound oxide deposited on a substrate, characterized in that an outer surface of the superconducting thin film is covered with a protective layer which is composed of polymer compound selected from the group consisting of silicon resins, epoxy resins and polyimide resins.

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**4,942,143**

**IMIDAZOTHIADIAZINE DERIVATIVES, AND THEIR USE AS MEDICAMENTS**

**Tsutomu Ohsaki, Saitama; Jinsaku Sakakibara, Nagoya, and Takeo Kuriki, Saitama, all of Japan, assignors to Hoechst Japan Limited, Tokyo, Japan**

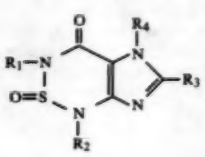
**Filed Apr. 6, 1988, Ser. No. 178,231**

**Claims priority, application Japan, Apr. 8, 1987, 62-86130; Aug. 21, 1987, 62-209066**

**Int. Cl.[5] A61K *31/54*; C07D *513/04***

**U.S. Cl. 514—222.8** **5 Claims**

1. A compound of the formula I



(I)

wherein $R_1$, $R_2$ and $R_4$ are each a $C_1$–$C_{10}$-alkyl group unsubstituted or substituted by one or two halogen atoms, oxo groups, amino groups, mono- or di-$C_1$–$C_6$-alkylamino groups, hydroxyl groups, $C_1$–$C_6$-alkoxy groups, phenoxy groups, morpholino groups, pyrrolidino groups, piperidino groups, or phenoxy groups which in turn are unsubstituted or substituted by one or two halogen atoms, $C_1$–$C_4$-alkyl groups, hydroxy groups, $C_1$–$C_4$-alkoxy groups, amino groups, mono- or di-$C_1$–$C_4$-alkylamino groups, oxo-($C_1$–$C_4$)-alkyl groups, sulfonamido groups or nitro groups, or $R_1$, $R_2$ and $R_4$ represent a phenyl or naphthyl group unsubstituted or substituted by one or two halogen atoms, $C_1$–$C_6$-alkyl groups, nitro groups, amino groups, hydroxyl groups, mono- or di-$C_1$–$C_6$-alkylamino groups, $C_1$–$C_6$-alkoxy groups, phenoxy groups, sulfonamido groups or oxo-$C_1$–$C_6$-alkyl groups; or $R_1$, $R_2$ and $R_4$ represent a benzyl or phenethyl group wherein the benzene ring is unsubstituted or substituted by one or two halogen atoms, nitro groups, hydroxyl groups, amino groups, mono- or di-$C_1$–$C_6$-alkylamino groups, $C_1$–$C_6$-alkoxy groups, phenoxy groups, sulfonamido groups or oxo-$C_1$–$C_6$-alkyl groups; and $R_3$ is a hydrogen atom, a halogen atom, a $C_1$–$C_{10}$-alkyl group which is unsubstituted or substituted by one or two halogen atoms, oxo groups, amino groups, mono- or di-$C_1$–$C_6$-alkylamino groups, hydroxyl groups, $C_1$–$C_6$-alkoxy groups, phenoxy groups, morpholino groups, pyrrolidino groups, piperidino groups or phenoxy groups, which in turn are substituted by one or two halogen atoms, $C_1$–$C_4$-alkyl groups, hydroxy groups, $C_1$–$C_4$-alkoxy groups, amino groups, mono- or di-$C_1$–$C_4$-alkylamino groups, oxo-$C_1$–$C_4$-alkyl groups, sulfonamido groups or nitro groups; or $R_3$ is a phenyl or naphthyl group which is unsubstituted or substituted by one or two halogen atoms, $C_1$–$C_6$-alkyl groups, nitro groups, amino groups, hydroxyl groups, mono- or di-$C_1$–$C_6$-alkylamino groups, $C_1$–$C_6$-alkoxy groups, phenoxy groups, sulfonamido

groups or oxo-$C_1$–$C_6$-alkyl groups; or $R_3$ is a benzyl or phenethyl group wherein the benzene ring is unsubstituted or substituted by one or two halogen atoms, nitro groups, hydroxyl groups, amino groups, mono- or di-$C_1$–$C_6$-alkylamino groups, $C_1$–$C_6$-alkoxy groups, phenoxy groups, sulfonamido groups or oxo-$C_1$–$C_6$-alkyl groups.

5. A method for the treatment of a patient in need of hypotensive and vasodilating activity which comprises administering to said patient an amount effective for said treatment of a compound of the formula 1 as defined in claim 1 or a pharmacologically acceptable acid addition salt thereof.

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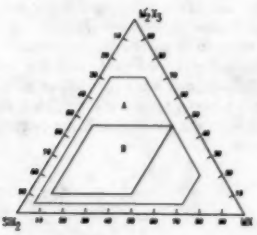
**4,942,144**

## INFRARED TRANSMITTING GLASSES WITH HIGH GLASS TRANSITION TEMPERATURES

**Steve W. Martin, Ames, Iowa, assignor to Iowa State University Research Foundation, Inc., Ames, Iowa**

**Filed Jan. 23, 1989, Ser. No. 300,580**
**Int. Cl.[5] C03C *3/32***
**U.S. Cl. 501—40** **7 Claims**



1. A chalcogenide glass having a range of infrared transmission, consisting essentially of: a glass mixture of the formula: $MX+M_2{}_3+SiX_2$, wherein M is

a metal selected from the group consisting of calcium, strontium, barium, zinc and lead, M' is a metal selected from the group consisting of aluminum and gallium and X is selected from the group consisting of sulfur, selenium and tellurium;

the mole percent of MX is within the range of from about 5% to about 70%, the mole percent of $M_2'X_3$ is within the range of from about 5% to about 70%, and the mole percent of $SiX_2$ is within the range of from about 10% to about 90%, and

the glass has a $T_g$ of at least 500° C.

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**4,942,145**

## PRECERAMIC COMPOSITIONS AND CERAMIC PRODUCTS

**William E. Moehle; John J. Rogers, and John Semen, all of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.**

**Filed May 26, 1989, Ser. No. 357,542**
**Int. Cl.[5] C04B *35/52, 35/54, 35/56, 35/58***
**U.S. Cl. 501—90** **7 Claims**

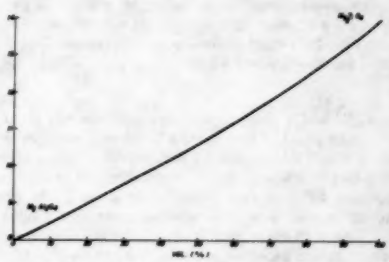
1. A preceramic molding composition having a particle size not larger than about 105 micrometers and consisting essentially of an intimate mixture of (A) about 50–90 parts by weight of powder ingredients comprising about 2–50% by weight of graphite powder and about 98–50% by weight of a second powder selected from silicon carbide, silicon nitride, and mixtures thereof and (B) correspondingly, about 50–10 parts by weight of a preceramic polysilazane binder.

**4,942,146**

## DENSE CERAMIC ALLOYS AND PROCESS OF MAKING SAME

**Taki Negas, and Louis P. Domingues, both of Adamstown, Md., assignors to Alpha Industries, Woburn, Mass.**

**Filed May 15, 1987, Ser. No. 49,984**
**Int. Cl.[5] C04B *35/46***
**U.S. Cl. 501—134** **14 Claims**



1. A single phase dense sintered ceramic dielectric alloy of the formula:

$$Mg_xAl_yTi_zO_4$$

wherein

$x+y+z=3$

$x=1-2$

$y=0.1-1.9$

$z=0.1-0.9$

having a dielectric constant of at least 8.5 and no more than 13.8 and a density of at least 98% of the theoretical density.

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**4,942,147**

## CATALYST SYSTEM CONTAINING AN AUTOACCELERATION INHIBITOR

**Frederick J. Karol, Belle Mead; Kao Sun-Chueh, Piscataway, and James S. Drage, Edison, all of N.J., assignors to Union Carbide Chemicals and Plastics Company, Inc., Danbury, Conn.**

**Filed May 8, 1989, Ser. No. 349,398**
**Int. Cl.[5] C08F *4/02, 4/60***
**U.S. Cl. 502—113** **35 Claims**

1. A transition metal catalyst system comprising a transition metal catalyst and an autoacceleration inhibitor, which (i) at about the temperature at which the catalyst system autoaccelerates, decomposes into a poison for the catalyst system; (ii) is present in the catalyst system in an amount sufficient to provide the quantity of poison required to inhibit the catalyst system at the autoacceleration temperature; and (iii) is either essentially inert at the normal operating temperature of the catalyst system or will cause substantially less inhibition of the catalyst system at the normal operating temperature than at the autoacceleration temperature.

**4,942,148**

## CATALYST COMPONENT FOR OLEFIN POLYMERIZATION

**Hiroyuki Furuhashi; Akira Nakano; Masahide Murata; Masafumi Imai, and Hiroshi Ueno, all of Saitama, Japan, assignors to Toa Nenryo Kogyo, K.K., Tokyo, Japan**

**Filed Oct. 12, 1988, Ser. No. 256,514**

**Claims priority, application Japan, Oct. 12, 1987, 62-25477**

**Int. Cl.[5] C08F 4/64**

**U.S. Cl. 502—115** **2 Claims**

1. A catalyst component for olefin polymerization, prepared by bringing a titanium-containing solid which comprises (a) a metal oxide, (b) an organomagnesium compound represented by the following general formula:

$$R^1MgR^2$$

wherein $R^1$ and $R^2$ each represents a hydrocarbon group containing from 1 to 20 carbon atoms, a halogen atom, or an $OR^3$ group in which $R^3$ represents a hydrocarbon group containing from 1 to 12 carbon atoms, provided that $R^1$ and $R^2$ do not represent a halogen atom at the same time, (c) an electron donor compound, and (d) a titanium compound having contacted with each other, into contact with (e) an α-olefin containing 3 carbon atoms or more in the presence of (f) an organoaluminum compound, to thereby contain a poly(α-olefin) in an amount of from 0.1 to 100 g per gram of said titanium-containing solid.

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**4,942,149**

## CROWN ETHER COMPOUND AND SEPARATING AGENT

**Toshio Shinbo, Ibaraki, Japan; Tomohiko Yamaguchi, Dortmund, Fed. Rep. of Germany, and Kouzou Tachibana, Hyogo, Japan, assignors to Director-General of Agency of Industrial Science and Technology, Tokyo and Daicel Chemical Industries, Sakai, both of, Japan**

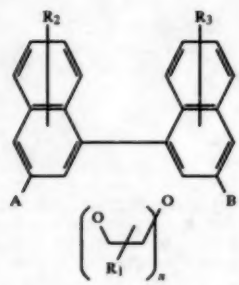
**Filed Aug. 25, 1989, Ser. No. 398,844**

**Claims priority, application Japan, Sep. 5, 1988, 63-221879**

**Int. Cl.[5] B01J 20/26; C07D 323/00**

**U.S. Cl. 502—401** **5 Claims**

1. A racemic or optically active crown ether compound having the formula



wherein A and B, which can be the same or different, are hydrogen, straight chain or branched alkyl having from 1 to 6 carbon atoms, aryl having from 6 to 10 carbon atoms, or aralkyl having from 7 to 9 carbon atoms,

$R_1$ is hydrogen or straight chain or branched alkyl having from 1 to 20 carbon atoms, wherein $R_1$ can be bonded to any carbon atom on the cyclic polyether and the number of $R_1$ groups is from 1 to 12, and n is an integer of from 3 to 10, and

$R_2$ and $R_3$, which can be the same or different, are straight chain or branched alkyl having from 1 to 30 carbon atoms, aryl having 6 to 18 carbon atoms, or aralkyl having 7 to 30 carbon atoms, wherein $R_2$ and $R_3$ can be located anywhere other than at the A and B substitution positions on the condensed ring, and the sum of the number of the $R_2$ and $R_3$ groups is from 2 to 5.

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**4,942,150**

## HEAT-SENSITIVE RECORDING MATERIAL

**Toshimasa Usami; Toshiharu Tanaka, and Masataka Kiritani, all of Shizuoka, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Division of Ser. No. 786,567, Oct. 11, 1985. This application Aug. 8, 1988, Ser. No. 230,818**

**Claims priority, application Japan, Oct. 12, 1984, 59-213958**

**The portion of the term of this patent subsequent to Jul. 1, 2003, has been disclaimed.**

**Int. Cl.[5] B41M 5/18**

**U.S. Cl. 503—213** **8 Claims**

1. A heat-sensitive recording material comprising a support having provided on the same surface thereof microcapsules containing a basic colorless dye and an organic solvent, and a developer capable of reacting with the basic colorless dye to develop a color, the capsule walls of said microcapsules being impermeable to said basic colorless dye and said developer at room temperature but becoming permeable to said basic colorless dye and/or said developer upon application of heat with a thermal head to thereby provide a color image, wherein said organic solvent is a compound containing at least two benzene rings, and said organic solvent may further contain at least one hetero atom selected from the group consisting of nitrogen, sulfur, oxygen and phosphorus atoms, the total number of hetero atoms constituting less than 10% of the total number of carbon atoms of said organic solvent, said organic solvent being selected from the group consisting of compounds represented by formula (I):

(I)

wherein $R^1$ represents a hydrogen atom or an alkyl group having from 1 to 18 carbon atoms; $R^2$ represents an alkyl group having from 1 to 18 carbon atoms; and $p^1$ and $q^1$ each represents an integer of from 1 to 4, with the proviso that the total number of alkyl groups does not exceed 4.

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**4,942,151**

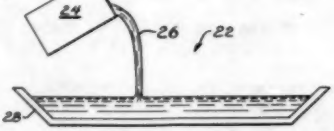
## MAGNETIC PREFERENTIAL ORIENTATION OF METAL OXIDE SUPERCONDUCTING MATERIALS

**Donald W. Capone; Bobby D. Dunlap, both of Bolingbrook, and Boyd W. Veal, Downers Grove, all of Ill., assignors to Arch Development Corporation, Argonne, Ill.**

**Filed Sep. 28, 1987, Ser. No. 101,820**

**Int. Cl.[5] C04B 33/28; B28B 1/26**

**U.S. Cl. 505—1** **15 Claims**




1. A method of forming a superconducting metal oxide with improved current carrying capacity wherein said superconducting metal oxide has a polycrystalline structure and is anisotropically superconducting having one or more longer crystal

axes along which said metal oxide is superconducting, said method comprising the steps of:

reducing the superconducting metal oxide to a flakelike, powder form, wherein the metal oxide powder is comprised of particles of single crystals, said superconducting metal oxide having a characteristic critical temperature below which it is superconducting;

mixing said metal oxide single crystal particles with binder and solvent to form a slip;

lowering the temperature of said metal oxide single crystal particles in said slip to said characteristic critical temperature;

directing a magnetic field onto said slip to orient said metal oxide single crystal particles along a preferential direction such that said one or more longer axes of each of said metal oxide crystals are in general alignment; and

removing the binder and solvent from the oriented metal oxide single crystal particles and sintering said metal oxide single crystal particles.

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**4,942,152**

**PROCESS FOR PREPARTING A BISMUTH-TYPE COMPOUND OXIDE SUPERCONDUCTOR**

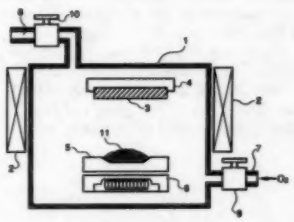
**Hideo Itozaki; Keizo Harada, and Shuji Yazu, all of Hyogo, Japan, assignors to Sumitomo Electric Industries, Ltd., Osaka, Japan**

**Filed Aug. 30, 1989, Ser. No. 400,819**

**Claims priority, application Japan, Aug. 30, 1988, 63-216036**

**Int. Cl.[5] C01F *11/02***

**U.S. Cl. 505—1** **20 Claims**



1. A process for preparing a superconductor of a bismuth-containing compound oxide, characterized by the steps comprising preparing an intermediate compound oxide composed of metal elements which are constituent elements of said superconductor except bismuth, and subjecting said intermediate compound oxide to heat-treatment at a temperature between 750° and 950° C. in an atmosphere containing bismuth oxide vapour so that bismuth oxide reacts with said intermediate compound oxide to produce the superconductor.

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**4,942,153**

**SKIN MOISTURIZING PRODUCT AND PROCESS**

**Helen M. Fernandez, 20938 Bandera St., Woodland Hills, Calif. 91364**

**Filed Feb. 3, 1987, Ser. No. 10,225**

**Int. Cl.[5] A61K *37/12, 35/28***

**U.S. Cl. 514—2** **12 Claims**

1. A skin moisturizing spray composition comprising:

a mixture consisting essentially of a water soluble animal collagen in the range of 1% to 2% with water in the range of 98% to 99%;

whereby said mixture can be applied to the skin in a fine mist spray with said water soluble collagen binding said water to moisturize the skin.

**4,942,154**

**STEROIDAL GLYCOLIPIDS AS HOST RESISTANCE STIMULATORS AGAINST VIRAL INFECTION**

**Philippe L. Durette, New Providence; Mitree M. Ponpipom, Branchburg, and William K. Hagmann, Westfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

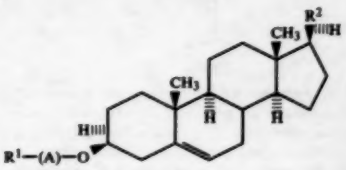
**Filed Jun. 18, 1987, Ser. No. 62,997**

**The portion of the term of this patent subsequent to Mar. 24, 2004, has been disclaimed.**

**Int. Cl.[5] A61K *31/705***

**U.S. Cl. 514—26** **9 Claims**

1. A method for enhancing host resistance to viral infection in an AIDS immunocompromised individual consisting of administering to said individual a composition consisting essentially of a compound of the formula:



where:

$R^1$ is α or β-D-1-thiomannopyranoside, α or β-L-1-thiofucopyranoside;

A is $(CH_2)_n$ where n is 5–7, or $(CH_2)_kX(CH_2)_m$ where X is O or S or NH and k and m are independently 2–4 and the sum of k and m is 4–6;

$R^2$ is $C_1$–$C_8$ linear or branched alkyl or $C_2$–$C_{10}$ linear or branched alkene;

where B is $C_1$–$C_8$ alkyl, $C_1$–$C_8$ alkoxy, $NR^3R^4$ where $R^3$ and $R^4$ are independently H, $C_1$–$C_4$ alkyl; $CH(CH_3)D$ where D is OH, $NH_2$, $NHR^5$ where $R^5$ is $C_1$–$C_{10}$ alkyl, or pharmaceutically acceptable salts thereof, in an amount effective to impart resistance to viral infection, and a pharmaceutically acceptable carrier therefor.

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**4,942,155**

**BIOSYNTHETIC ANTHRACYCLINES RELATED TO DAUNORUBICIN**

**Giuseppe Cassinelli, Voghera; Arpad Grein, Milan; Sergio Merli, Bernareggio MI, and Giovanni Rivola, Milan, all of Italy, assignors to Farmitalia Carlo Erba S.p.A., Milan, Italy**

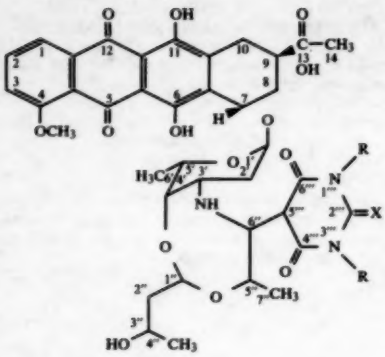
**Filed Mar. 9, 1987, Ser. No. 23,390**

**Claims priority, application United Kingdom, Mar. 13, 1986, 8606204**

**Int. Cl.[5] C07H *15/252***

**U.S. Cl. 514—34** **3 Claims**

1. A anthracycline glycoside of the general formula:



wherein R represents a methyl group and X is an oxygen atom, or R represents hydrogen and X is a sulphur atom.

3. A pharmaceutical composition for inhibiting the growth of P 388 leukemia and Gross leukemia comprising a therapeutically effective amount of a compound as claimed in claim 1 in admixture with a pharmaceutically acceptable diluent or carrier.

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**4,942,156**

**LOW MOLECULAR WEIGHT HEPARIN DERIVATIVES HAVING IMPROVED ANTI-XA SPECIFICITY**

**Kevin M. Foley, Franklin; Charles C. Griffin, Oxford, and Eduardo Amaya, Monroe, all of Ohio, assignors to Hepar Industries, Inc., Franklin, Ohio**

**Filed Aug. 20, 1986, Ser. No. 898,431**

**The portion of the term of this patent subsequent to May 17, 2005, has been disclaimed.**

**Int. Cl.[5] A61K *31/715*; C08B *37/10***

**U.S. Cl. 514—56** **9 Claims**

1. An ester of low molecular weight heparin characterized by an anti-Xa/APTT ratio greater than 2.8 wherein the ester is prepared by reacting an acid chloride with low molecular weight heparin wherein more than 50% of the ester groups are lower alkyl.

9. A pharmaceutically active composition comprising a pharmaceutically acceptable carrier or diluent and a pharmaceutically effective amount of a product as claimed in claim 1, claim 2, claim 3, claim 4, claim 5, claim 6, claim 7, or claim 8.

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**4,942,157**

**1-HYDROXY-3-(N-METHYL-N-PROPYLAMINO)PROPANE-1,1-DIPHOSPHONIC ACID, PHARMACEUTICAL COMPOSITIONS AND METHODS OF USE**

**Rudi Gall, and Elmar Bosies, both of Mannheim, Fed. Rep. of Germany, assignors to Boehringer Mannheim GmbH, Mannheim, Fed. Rep. of Germany**

**Filed Jul. 9, 1987, Ser. No. 71,320**

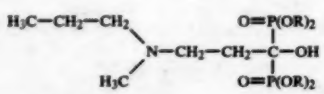
**Claims priority, application Fed. Rep. of Germany, Jul. 11, 1986, 3623397**

**The portion of the term of this patent subsequent to May 22, 2007, has been disclaimed.**

**Int. Cl.[5] A61K *31/66***

**U.S. Cl. 514—108** **7 Claims**

1. A diphosphonate compound of the formula



(I)

wherein R is hydrogen, and the pharmacologically acceptable salts thereof.

2. A pharmaceutical composition for the treatment or prophylaxis of calcium metabolism disturbance or disease containing an effective amount of at least one compound of claim 1 in pharmaceutically acceptable carrier.

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**4,942,158**

**TRANSDERMAL STEROID PENETRANT COMPOSITIONS AND METHODS UTILIZING ISOPROPANOL AND ISOBUTANOL**

**Pramod P. Sarpotdar, Malvern, Pa., and Tammy B. Strassburg, Rochester, N.Y., assignors to Eastman Kodak, Rochester, N.Y.**

**Filed Oct. 13, 1988, Ser. No. 257,374**

**Int. Cl.[5] A61K *31/56***

**U.S. Cl. 514—170** **20 Claims**

1. A topical composition for the transdermal delivery of a steroid drug which comprises a therapeutically effective amount of a steroid drug in a vehicle comprising a mixture of isopropyl alcohol and isobutyl alcohol, each of these alcohols being present in an amount of from about 45% to about 55% by weight based on the weight of said mixture.

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**4,942,159**

**CEPHEM COMPOUNDS, THEIR PRODUCTION AND USE**

**Shoji Kishimoto, Hyogo; Kiminori Tomimatsu, and Akio Miyake, both of Osaka, all of Japan, assignors to Takeda Chemical Industries, Ltd., Osaka, Japan**

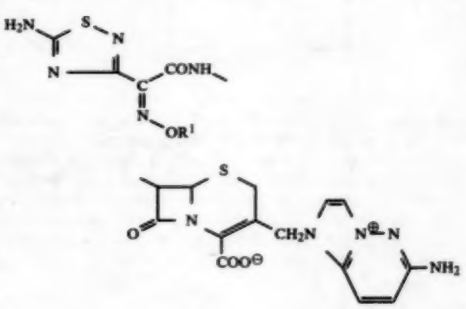
**Filed Aug. 24, 1988, Ser. No. 235,566**

**Claims priority, application Japan, Aug. 25, 1987, 62-212567**

**Int. Cl.[5] C07D *501/46*; A61K *31/545***

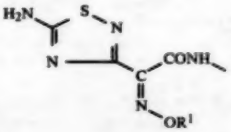
**U.S. Cl. 514—202** **8 Claims**

1. A cephem compound of the formula:



wherein $R^1$ is a lower alkyl group, or a pharmaceutically acceptable salt or ester thereof.

7. An antimicrobial composition which contains an effective dose of a cephem compound of the general formula:



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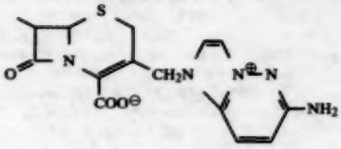

wherein $R^1$ is a lower alkyl group, or a pharmaceutically acceptable salt or ester thereof, together with a carrier or carriers.

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**4,942,160**

**NOVEL TREATMENT**

**Gareth J. Sanger, and Helen E. Marr, both of Harlow, England, assignors to Beecham Group p.l.c., Middlesex, England**

**Division of Ser. No. 145,537, Jan. 19, 1988, Pat. No. 4,845,092. This application May 5, 1989, Ser. No. 348,051**

**Claims priority, application United Kingdom, Jan. 19, 1987, 8701022**

**Int. Cl.[5] A61K *31/00***

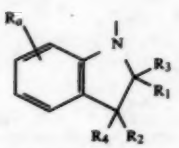
**U.S. Cl. 514—216** **4 Claims**

1. A method of treatment of visceral pain in mammals, including humans, which method comprises the administration to the mammal in need of such treatment, a visceral pain relieving effective amount of a compound of formula (I) or a pharmaceutically acceptable salt thereof:

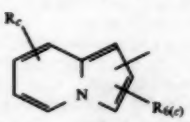
(I)

wherein

X is a group of formula (a), or (c):



(a)



wherein

$R_a$ and $R_c$ are selected from hydrogen, halogen and hydroxy;

$R_1$ is hydrogen and $R_2$ is hydrogen or $C_{1-4}$ alkyl; or

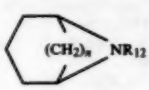
$R_1$ and $R_2$ together are bond;

$R_3$, $R_4$ and $R_6$ are independently hydrogen or $C_{1-4}$ alkyl; and

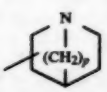
$R_4$ together with $R_2$ may be $C_{2-7}$, polymethylene when $R_1$ is hydrogen;

Y is NH or O;

Z is a group of formula (f), (g) or (h):

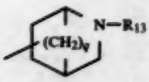


(f)



(g)

-continued



(h)

wherein

n is 2 or 3;

p and q are independently 1 to 3; and

$R_{12}$ or $R_{13}$ is methyl or ethyl.

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**4,942,161**

**USE OF BETA BLOCKERS FOR THE TREATMENT OF THE PROGRESSION OF INFANTILE AXIAL MYOPIA**

**Heinfried Tiburtius, Breitenbachplatz 21, 1000 Berlin 33, Fed. Rep. of Germany**

**Filed Feb. 24, 1989, Ser. No. 315,096**

**Claims priority, application Fed. Rep. of Germany, Feb. 25, 1988, 3805882**

**Int. Cl.[5] A61K *31/535, 31/425, 31/385, 31/38***

**U.S. Cl. 514—231.2** **3 Claims**

1. A method for treatment of progressive infantile axial myopia in the presence of normal internal eye pressure comprising the step of administering to the eye of a patient a therapeutically effective amount of an aqueous solution of an opthalmologically acceptable beta blocker present in amounts such that on repeated administration essentially no side effects of a systemic nature are observed.

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**4,942,162**

**TOPICAL TREATMENT OF SEBORRHEIC DERMATITIS WITH KETOCONAZOLE**

**E. William Rosenberg, Memphis, and Patricia W. Belew-Noah, Germantown, both of Tenn., assignors to University of Tennessee Research Corporation, Knoxville, Tenn.**

**Continuation of Ser. No. 815,232, Dec. 31, 1985, abandoned, which is a division of Ser. No. 559,929, Dec. 9, 1983, Pat. No. 4,569,935, which is a continuation-in-part of Ser. No. 474,214, Mar. 17, 1983, Pat. No. 4,491,588, which is a continuation-in-part of Ser. No. 363,845, Mar. 31, 1982, abandoned. This application Jan. 27, 1989, Ser. No. 303,960**

**Int. Cl.[5] A61K *31/50, 31/495***

**U.S. Cl. 514—252** **3 Claims**

1. A method of treating seborrheic dermatitis in humans by topical application of an effective, lesion reducing, amount of ketoconazole to affected areas.

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**4,942,163**

**1(2H)-ISOQUINOLINONES AND 1-ISOQUINOLINEAMINES AS CANCER CHEMOTHERAPEUTIC AGENTS**

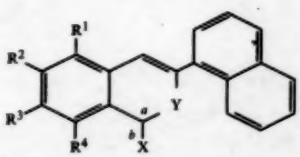
**Carl H. Behrens, Wilmington, Del., assignor to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Filed Mar. 7, 1989, Ser. No. 322,191**

**Int. Cl.[5] A61K *31/495*; C07D *401/04***

**U.S. Cl. 514—254** **40 Claims**

1. A compound of Formula (I)



(I)

wherein

$R^1$ is H, $CH_3$, or Cl;

$R^2$ is H, $CH_3$, or Cl;

$R^3$ is $R^5$, Cl, $N(R^5)_2$, or $N^+(R^5)_3I^-$ provided that, if X is $NR^6R^7$, $R^3$ is not $N(R^5)_2$ or $N^+(R^5)_3I^-$;
$R^4$ is H, $CH_3$, or Cl;
$R^5$ is H, or $C_1$ to $C_3$ alkyl;
X is O, or $NR^6R^7$; provided that, if X is O, a is a single bond, b is a double bond, and Y is NH, and, if X is $NR^6R^7$, a is a double bond, b is a single bond, and Y is N;
$R^6$ and $R^7$ independently are $R^5$, $(CH_2)_nN(R^5)_2$ where n is 2 to 8, or $R^6$ and $R^7$ taken together represent $(CH_2CH_2)_2NR^5$; and pharmaceutically acceptable salts thereof.

21. A method of treating lymphocytic leukemia in a mammal comprising administering to a mammal a therapeutically effective amount of a compound of claim 1.

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**4,942,164**

## POLYFLUORINATED DIISOCYANATES AND FLUORINATED POLYURETHANES PREPARED THEREFROM

**Kurt Baum, Pasadena; Aslam A. Malik, San Dimas, and Donald D. Tzeng, San Jose, all of Calif., assignors to Fluorochem Inc., Azusa, Calif.**

**Filed May 8, 1989, Ser. No. 350,130**
**Int. Cl.[5] C08G *18/77***
**U.S. Cl. 528—70** **13 Claims**

1. As a composition of matter, a polyfluorinated diisocyanate having the formula $OCN—CH_2CH_2—(CF_2)_n—CH_2CH_2—NCO$, wherein n is a whole number of from 2 to 16, inclusive.

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**4,942,165**

## TREATMENT FOR ALZHEIMER'S DISEASE

**Richard D. Rotondo, St. Paul, Minn., assignor to Advanced Biologics, Inc., Minneapolis, Minn.**

**Continuation of Ser. No. 828,763, Feb. 11, 1986, Pat. No. 4,814,339. This application Nov. 28, 1988, Ser. No. 276,818**
**Int. Cl.[5] A61K *31/44, 31/52***
**U.S. Cl. 514—261** **15 Claims**

1. A method of treatment of degenerative mental process in a living subject which consists of administering to said living subject in need of treatment an effective amount of a carrier compound bonded to acetylcholine for transporting choline to the brain, said carrier compound is hydropyridine.

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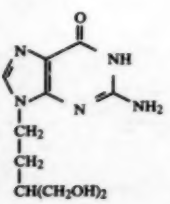
**4,942,166**

## CRYSTALLINE PURINE COMPOUNDS

**Michael R. Harnden; Richard L. Jarvest, and Graham R. Geen, all of Epsom, England, assignors to Beecham Group p.l.c., Middlesex, England**

**Continuation of Ser. No. 221,894, Jul. 20, 1988, abandoned, which is a continuation of Ser. No. 889,362, Jul. 25, 1986, abandoned. This application Jun. 30, 1989, Ser. No. 374,628**
**Claims priority, application United Kingdom, Jul. 27, 1985, 8519011; Dec. 11, 1985, 8530491**
**Int. Cl.[5] C07D *473/18;* A61K *31/52***
**U.S. Cl. 514—262** **8 Claims**

1. A crystalline monohydrate of the compound of formula (A) or a crystalline sodium salt monohydrate of the compound of formula (A):



(A)

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**4,942,167**

## PHARMACEUTICAL COMPOSITIONS OF PIROXICAM IN AQUEOUS SOLUTIONS AND PROCESS FOR THEIR PREPARATION

**Paolo Chiesi, and Luciana Pavesi, both of Parma, Italy, assignors to Chiesi Farmaceutici S.p.A., Parma, Italy**

**Filed Mar. 31, 1989, Ser. No. 331,457**
**Claims priority, application Italy, Apr. 1, 1988, 20073 A/88**
**Int. Cl.[5] A61K *31/54***
**U.S. Cl. 514—226.5** **7 Claims**

1. A process for the preparation of an aqueous pharmaceutical composition containing as active ingredient a basic salt of piroxicam which consists of (a) dispersing piroxicam in water in a concentration between 1 and 4% w/v; (b) adding under stirring an aqueous solution of an alkali or alkaline earth metal hydroxide in stoichiometric amount up to complete dissolution; (c) adding glycine in an amount between 8 and 10% w/v as a pH stabilizer and stirring to obtain a ready to use solution.

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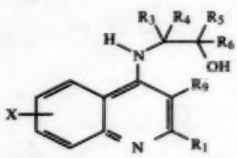
**4,942,168**

## HYDROXYQUINOLINE AMINES, AND METHOD OF ENHANCING MEMORY IN MAMMALS

**Karl Schonafinger, Alzenau, Fed. Rep. of Germany, and Helen H. Ong, Whippany, N.J., assignors to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.**

**Division of Ser. No. 72,832, Jul. 13, 1987, Pat. No. 4,743,601. This application Mar. 7, 1988, Ser. No. 164,596**
**Int. Cl.[5] A61K *31/47;* C07D *215/46***
**U.S. Cl. 514—313** **12 Claims**

1. A compound of the formula



where X is hydrogen, loweralkyl, loweralkoxy, hydroxy, halogen, nitro or trifluoromethyl; $R_1$ is hydrogen or loweralkyl; $R_3$ and $R_4$ are independently hydrogen or loweralkyl; $R_5+R_6$ taken together with the carbon atom to which they are attached constitute a cyclopropane, cyclobutane, cyclopentane, or cyclohexane ring, and $R_9$ is hydrogen or bromine, the term loweralkyl in each occurrence signifying a straight or branched alkyl group having from 1 to 6 carbon atoms and the term loweralkoxy signifying a straight or branched alkoxy group having from 1 to 6 carbon atoms, or a pharmaceutically acceptable acid addition salt thereof.

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**4,942,169**

## PIPERIDINE DERIVATIVE AND PHARMACEUTICAL COMPOSITION

**Hachiro Sugimoto, Ushiku; Takaharu Nakamura, Abiko; Yutaka Tsuchiya, Ushiku; Hiroyuki Sugumi, Yatabemachi; Kunizou Higurashi, Tokyo; Norio Karibe, Yatabemachi; Yoshiharu Yamanishi, Ryugasaki; Hiroo Ogura, Tsuchiura; Shin Araki; Atsuhiko Kubota, both of Ibaraki; Michiko Ohtake, Mitsukaido, and Kiyomi Tamatsu, Kamakura, all of Japan, assignors to Eisai Co., Ltd., Tokyo, Japan**

**Division of Ser. No. 946,459, Dec. 24, 1986, Pat. No. 4,849,431. This application Mar. 10, 1989, Ser. No. 321,624**
**Claims priority, application Japan, Dec. 27, 1985, 60-293885**
**Int. Cl.[5] A61K *31/445;* C07D *401/12***
**U.S. Cl. 514—318** **18 Claims**

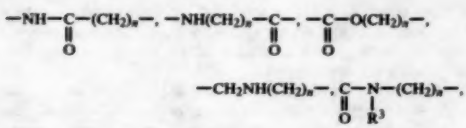
1. A piperidine derivative having the formula (I) or a pharmacologically acceptable salt thereof:

(I)

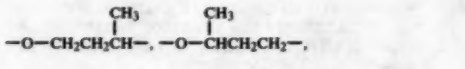
wherein

$R^1$ is a univalent group derived from one compound selected from the group consisting of pyridine, pyridinecarboxylic acid imide and pyridine N-oxide,

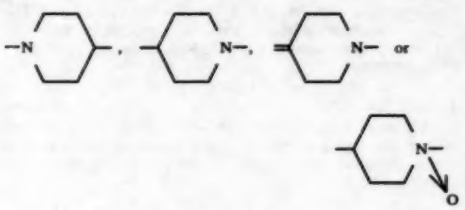
X is $-(CH_2)_n-$, $-O(CH_2)_n-$, $-S(CH_2)_n-$, $-NH(CH_2)_n-$, $-SO_2NH(CH_2)_n-$,



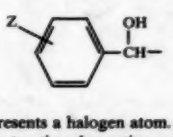
(wherein n is an integer of 1 through 7 and $R^3$ is hydrogen, lower alkyl or benzyl),



A is



and $R^2$ is hydrogen, lower alkyl, benzyl, substituted benzyl, benzoyl, substituted benzoyl, pyridyl, 2-hydroxyethyl, pyridylmethyl or a group of the formula



wherein Z represents a halogen atom.

17. A method for treating dementias and sequelae of cerebrovascular diseases which comprises administering to a patient requiring such treatment a pharmacologically effective amount of the piperidine derivative as defined in claim 1.

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**4,942,170**

**2-(SUBSTITUTED METHYLIDENE)-N-[3-[PIPERIDIN-1-YL]PROPYL]HYDRAZINE CARBOXIMIDAMIDES USEFUL AS ANTIPARASITICS**

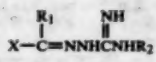
**Graeme B. Henderson; Peter C. Ulrich, both of New York, and Anthony Cerami, Shelter Island, all of N.Y., assignors to The Rockefeller University, New York, N.Y.**

**Filed May 27, 1988, Ser. No. 199,664**

**Int. Cl.[5] A61K *31/445***

**U.S. Cl. 514—326** **6 Claims**

1. A method of treating diseases caused by parasitic kinetoplastids in a host vertebrate which comprises administration of a pharmaceutically effective antiparasitic amount of a competitive toxigenic substrate for trypanothione reductase of the formula



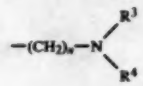
(I)

wherein

$R_1$=H, or lower alkyl;

X=a substituted or unsubstituted furanyl or thienyl group;

$R_2$=an alkylaminoalkyl group of the formula:



wherein n is an integer of from 1 to 6 and $R_3$ and $R_4$ together form a piperidine ring, optionally substituted.

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**4,942,171**

**THE COMPOUND, 6-(1-IMIDAZOLYL METHYL)-5,6,7,8-TETRAHYDRONAPHTHALENE-2-CARBOXYLIC ACID AND SALTS THEREOF HAVING ANTIDIABETIC ACTIVITY**

**Hidemi Masumura; Kyoko Sakuma, and Shinichiro Ashida, all of Tokyo, Japan, assignors to Daiichi Seiyaku Co., Ltd., Tokyo, Japan**

**Filed Jul. 6, 1988, Ser. No. 215,488**

**Claims priority, application Japan, Jul. 7, 1987, 62-169486**

**Int. Cl.[5] C07D *233/60*; A61K *31/415***

**U.S. Cl. 514—399** **2 Claims**

1. A method for treating a patient in need of an antidiabetaic agent which comprises administering thereto an antidiabetically effective amount of the compound 6-(1-imidazolylmethyl)-5,6,7,8-tetrahydronaphthalene-2-carboxylic acid or a pharmaceutically acceptable salt thereof.

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**4,942,172**

**METHOD OF CURING HEPATIC DISEASE**

**Hitoshi Nakazawa, Narita; Mari Ohtsuka, Narashino; Hideaki Matsuda, Abiko; Tatsuhiko Katori, Tone, and Kazuhiko Irinoda, Chiba, all of Japan, assignors to SS Pharmaceutical Co., Ltd., Tokyo, Japan**

**Filed May 20, 1988, Ser. No. 196,431**

**Claims priority, application Japan, Sep. 25, 1987, 62-241543; Jan. 21, 1988, 63-11075**

**Int. Cl.[5] A61K *31/385***

**U.S. Cl. 514—441** **7 Claims**

1. A method of curing of alleviating hepatic disease in a mammal suffering from a hepatic disease selected from the group consisting of cirrhosis, alcoholic hepatitis, and virus-derived hepatitis, comprising: administrating to said mammal a therapeutically effective amount of a cyclic sulfur-containing compound represented by the following formula (I):

wherein the dotted line is optionally present and wherein the groups $R_1$ and $R_2$ are independently selected from the group consisting of hydrogen; $C_{1-20}$ alkyl groups and $C_{2-12}$ alkenyl groups.

4,942,173

## PESTICIDAL COMPOUNDS

John E. Casida, Berkeley, Calif.; Christopher J. Palmer, Ipswich; John P. Larkin, Buzzard, both of England, and Ian H. Smith, Eaton Bray, United Kingdom, assignors to The Regents of the University of California, Berkeley, Calif.

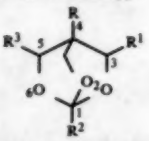
Continuation of Ser. No. 891,697, Jul. 29, 1986, abandoned, Continuation-in-part of Ser. No. 779,167, Sep. 23, 1985, Pat. No. 4,772,624, which is a continuation-in-part of Ser. No. 692,818, Jan. 23, 1984, which is a continuation-in-part of Ser. No. 575,843, Jan. 30, 1984. This application Feb. 24, 1989, Ser. No. 315,247

Claims priority, application United Kingdom, Mar. 12, 1986, 8606130

Int. Cl.[5] C07D *323/04*; A01N *43/32*

U.S. Cl. 514—452 9 Claims

1. A compound of the formula (I):



(I)

wherein R is $C_{2-10}$ alkyl, alkenyl or alkynyl, each optionally substituted by or methyl substituted by cyano, $C_{3-4}$ cycloalkyl, halo, $C_{1-4}$ alkoxy or a group S(O)m $R^4$ where $R^4$ is $C_{1-4}$ alkyl and m is 0, 1 or 2, or R is $C_{3-10}$ cycloalkyl, $C_{4-10}$ cycloalkenyl or phenyl, each optionally substituted by $C_{1-4}$ alkoxy, $C_{1-3}$ alkyl, $C_{2-4}$ alkynyl, halo, cyano or a group S(O)m $R^4$ as defined hereinbefore; $R^1$ is halo, $C_{1-3}$ alkyl, $C_{2-3}$ alkenyl or alkynyl each optionally substituted by halo, cyano, $C_{1-4}$ alkoxy, alkyl carbalkoxy containing up to 6 carbon atoms, a group S(O)m $R^4$ as defined hereinbefore or alkynyl substituted by tri-$C_{1-4}$ alkylsilyl, or $R^1$ is cyano, spirocyclopropyl, gem dimethyl, gem dicyano, gem diethynyl, oxo or methylene optionally substituted by cyano or $C_{1-3}$ alkyl optionally substituted by fluorine, or $R^1$ and R and the carbon atoms to which they are attached form a $C_{5-7}$ carbocyclic ring optionally substituted by halo, $C_{1-3}$ alkyl or alkoxy or $C_{2-3}$ alkenyl, $R^2$ is phenyl substituted by an $C_{2-3}$ alkynyl group or by a tri-$C_{1-4}$ alkylsilylalkynyl group and $R^3$ is hydrogen, $C_{1-3}$ alkyl, $C_{2-3}$ alkenyl or alkynyl each optionally substituted by cyano, $C_{1-4}$ alkylthio, $C_{1-4}$ alkoxy or halo, or $R^3$ is cyano or halo.

7. An insecticidal or acaricidal composition comprising a compound of formula (I) in admixture with a carrier or diluent.

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4,942,174

## NOVEL SEBOSUPPRESSIVE COMPOUNDS AND PREPARATIONS

Hinrich Moeller, and Siegfried Wallat, both of Monheim, Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany

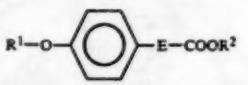
Filed Nov. 10, 1988, Ser. No. 269,940

Claims priority, application Fed. Rep. of Germany, Nov. 12, 1987, 3738407

Int. Cl.[5] C07C *69/76*

U.S. Cl. 514—532 20 Claims

1. In a preparation intended for topical application to human skin, the improvement comprising the presence, in a sebosuppressive effective amount, of an alkyl aryl ether corresponding to the formula:



in which $R^1$ is a $C_8$–$C_{20}$ alkyl group with at least one branch, E is either —$CH_2$–$C_2$ or —CH=CH—, and $R^2$ is selected from the group consisting of a $C_1$–$C_4$ alkyl group, a $C_2$–$C_4$ hydroxyalkyl group, an alkoxyalkyl group containing 1 to 4 C atoms in the alkoxy group and 2 to 4 C atoms in the alkyl group, hydrogen, and a salt-forming cation.

4,942,175

## COMPOSITION FOR THE TREATMENT OF SUBSTANCE ABUSE

Patrick J. Frawley, III, Santa Barbara, Calif., assignor to Schick Laboratories, Inc., Los Angeles, Calif.

Filed Apr. 24, 1987, Ser. No. 42,263

Int. Cl.[5] A61K *31/24*

U.S. Cl. 514—535 19 Claims

1. A powdered composition suitable for use in the aversion therapy treatment of cocaine abuse, the composition consisting essentially of:

(A) from about 1.0 to about 3.0 weight percent, based on total composition weight, of a local anesthetic selected from the group consisting of tetracaine, procaine and mixtures thereof; and

(B) from about 95 to about 99 weight percent, based on total composition weight, of a carrier compound selected from the group consisting of mannitol, inositol and mixtures thereof.

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4,942,176

## N-SUBSTITUTED AMINOALKANOIC ACIDS, A PROCESS FOR THEIR PREPARATION, THEIR USE AND PHARMACEUTICAL PRODUCTS BASED ON THESE COMPOUNDS

Heinrich C. Englert, Hofheim am Taunus; Max Hropot, Flörsheim am Main; Hans-Jochen Lang, Hofheim am Taunus, and Rainer Greger, Heitersheim, all of Fed. Rep. of Germany, assignors to Hoechst Aktiengellschaft, Frankfurt am Main, Fed. Rep. of Germany

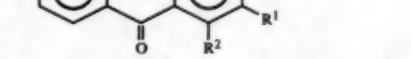
Continuation of Ser. No. 25,582, Mar. 13, 1987, abandoned. This application May 4, 1989, Ser. No. 348,115

Claims priority, application Fed. Rep. of Germany, Mar. 15, 1986, 3608725

Int. Cl.[5] C07C *101/78*

U.S. Cl. 514—539 1 Claim

1. A method for treating diarrhea or the loss of water and electrolytes which comprises administering to one in need of treatment an effective amount of a compound according to the following formula I:



I

in which

$R^1$, $R^2$ and $R^3$ are identical or different and are H, alkyl having 1–2 carbon atoms, F, Cl, Br or I,

$R^4$ is H or alkyl having 1–4 carbon atoms,

n is a number from 2 to 5, and

$R^5$ is hydrogen or a radical which ca be eliminated under physiological conditions,

or a pharmaceutically acceptable salt thereof.

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4,942,177

## COMPOSITION AND METHOD FOR CLEANING AND SANITIZING THE TEATS OF MILK PRODUCING ANIMALS

Keith G. Kastendieck, Rte. 1 Box 410, Washington, Mo. 63090

Filed Nov. 9, 1988, Ser. No. 269,198

Int. Cl.[5] A01N *37/00*

U.S. Cl. 514—560 11 Claims

1. A disinfectant and sanitizing composition for teats and udders of milk producing dairy animals, said composition consisting essentially of food additive materials which are harmless to milk produced subject to migration of the composition from said teats into the milk, said composition having a pH

of about 7 and consisting essentially of an aqueous solution of an effective amount of sodium undecylenate as a disinfectant and sanitizing agent and a water soluble organic solvent for said sodium undecylenate, said organic solvent having an emollient characteristic and comprising at least one member of the group consisting of propylene glycol, glycerin, sorbitol, polyethylene glycol, polyethylene glycol fatty acid esters, ethoxylated glycerin, glycol and sorbitol esters.

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**4,942,178**

## PLANT PROTECTION AGENTS FOR CONTROL OF FUNGI

**Shigeaki Toyoda, Wako; Shunnosuke Watanabe, Higashikurume, and Hiroshi Tabata, Tokyo, all of Japan, assignors to Agro-Kanesho Co., Ltd., Tokyo, Japan**

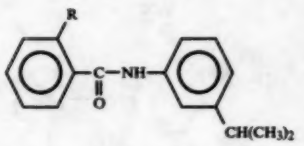
**Filed Nov. 30, 1988, Ser. No. 278,243**

**Claims priority, application Japan, Dec. 1, 1987, 62-304121**

**Int. Cl.[5] A01N *37/18*; C07C *233/65***

**U.S. Cl. 514—617** **2 Claims**

1. A plant protection agent for control of fungi represented by the following general formula:




[I]

wherein R stands for a trifluoromethyl group.

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**4,942,179**

## SINGLE-PHASE COMPOSITION CONTAINING A PERFLUORINATED OIL AND ONE OR MORE SURFACTANT(S), USEFUL AS AN EXCIPIENT FOR COSMETIC AND DERMATOLOGIC FORMULATIONS, AS WELL AS FOR BIOMEDICAL APPLICATIONS

**Enrico Borgarello, Turin; Filippo M. Carlini, Vicenza; Carlo Neri, San Donato Milanese, and Edoardo Platone, Asti, all of Italy, assignors to Enitricherche S.p.A., Milan and Enichem Synthesis S.p.A., Palermo, both of, Italy**

**Filed Jun. 14, 1988, Ser. No. 206,599**

**Claims priority, application Italy, Jun. 23, 1987, 20977 A/87; Jun. 23, 1987, 20998 A/87**

**Int. Cl.[5] A61K *31/13, 31/535, 31/445, 31/35***

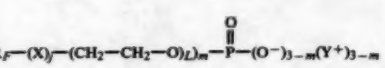
**U.S. Cl. 514—659** **15 Claims**

1. A spontaneously formed single-phase composition useful as an excipient in cosmetic, dermatologic, and biomedical applications, having isotropic or anisotropic forms, the composition comprising:

(a) a perfluorinated oil;

(b) water; and

(c) a surfactant having the formula:

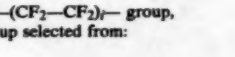


(I)

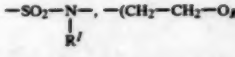
wherein,

$R_F$ is a F—$(CF_2—CF_2)_i$— group,

X is a group selected from:



—$SO_2$—N(R[I])—, —$(CH_2—CH_2—O)_K$—,



—C(=O)—N(R[I])—, —$(CH_2—CH_2—S)_K$—,

—$(CH_2—O)_K$—, and —$(CH_2—S)_K$—, wherein $R^I$ is a $(C_1–C_4)$-alkyl,

Y is a group selected from: $NH_2(R^{II})_2$ and $N(R^{II})_4$, wherein $R^{II}$ is a hydrogen atom, or a group selected from —$CH_2$—$CH_2$—OH and $(C_1–C_4)$-alkyl,

i is an integer from 3 to 8,

j is zero or 1,

K is 2.L,

L is an integer from 1 to 10, and

m is 1 or 2.

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**4,942,180**

## ANTITUMOR CHAMIGRENE DERIVATIVES AND THEIR METHODS OF USE

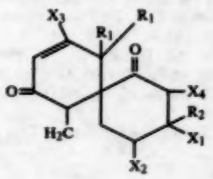
**Tatsuo Higa, Okinawa, Japan, and Kenneth M. Snader, Vero Beach, Fla., assignors to Harbor Branch Oceanographic Institution, Inc., Ft. Pierce, Fla.**

**Filed Sep. 4, 1985, Ser. No. 772,390**

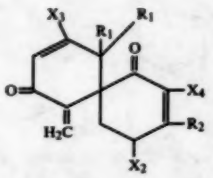
**Int. Cl.[5] A61K *31/12*; C07C *49/553***

**U.S. Cl. 514—691** **6 Claims**

1. A composition of the formula I or II:



I



II

wherein both $R_1$ groups are the same and are —H or —A,

A is lower alkyl,

$R_2$ is —H or —A,

$X_1$, $X_2$, $X_3$ and $X_4$ are the same or different and are —H, —OH, —F, —Cl, —Br, —I or —OA.

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**4,942,181**

## METHOD OF PROTECTING FISH

**Urs N. Riede, Freiburg-St. Georgen, and Ulrich Spitaler, Freisheim, both of Fed. Rep. of Germany, assignors to Rutgerswerke AG, Fed. Rep. of Germany**

**Filed Aug. 11, 1989, Ser. No. 392,710**

**Claims priority, application Fed. Rep. of Germany, Sep. 9, 1988, 3830616**

**Int. Cl.[5] A01N *31/00***

**U.S. Cl. 514—730** **7 Claims**

1. A method of protecting fish from stress due to increasing oxygen shortage and/or an increase in ammonia content of the water comprising adding to the water in which the fish are living a sufficient amount of low molecular weight alkali metal huminate with an average molecular weight of 1000 and a range 300 to 1500 to prevent stress.

**4,942,182**

## TREATMENT FOR COCAINE ADDICTION

**Susan R. B. Weiss, 4522 Chestnut St., Bethesda, Md. 20814; Robert M. Post, 3510 Turner La., Chevy Chase, Md. 20815, and Thomas G. Aigner, 5900 Ryland Dr., Bethesda, Md. 20817**

**Filed Mar. 1, 1989, Ser. No. 317,405**
**Int. Cl.[5] A61K *27/00***
**U.S. Cl. 514—812** **6 Claims**

1. A method of blocking toxic effects of cocaine comprising the chronic administration of carbamazepine to a host susceptible to cocaine addiction in an amount sufficient to achieve a 4 0 12 ug/ml blood concentration of carbamazepine.

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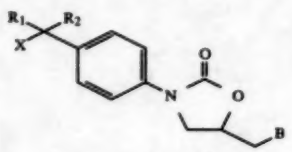
**4,942,183**

## AMINOMETHYL OXOOXAZOLIDINYL AROYLBENZENE DERIVATIVES USEFUL AS ANTIBACTERIAL AGENTS

**Walter A. Gregory, and Hollis S. Kezar, III, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

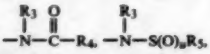
**Continuation of Ser. No. 109,032, Oct. 16, 1987, abandoned. This application Jul. 7, 1989, Ser. No. 376,456**
**Int. Cl.[5] A61K *31/42*; C07D *263/22***
**U.S. Cl. 514—376** **36 Claims**

1. A compound having the formula:



(I)

wherein for the l isomer or racemic mixtures containing it B is $NH_2$,



or $N_3$

u is 1 or 2;

$R_3$ is H, alkyl of 1–10 carbon atoms, or cycloalkyl of 3–8 carbon atoms;

$R_4$ is H, alkyl of 1–4 carbon atoms, alkenyl of 2–4 carbon atoms, cycloalkyl of 3–4 carbon atoms, or $OR_5$;

$R_5$ is alkyl of 1–4 carbon atoms;

$R_1$ and $R_2$ taken together are $H_2$, H and OH, =O, =NOH, H and $N(R_6)_2$, $=NOR_5$, or

is H or alkyl of 1–4 carbon atoms;

X is pyridinyl or phenyl optionally substituted from 1–3 substitutents each independently selected from a group selected from halogen, alkyl of 1–4 carbon atoms, $OR_5$, or $S(O)_mR_5$; provided that when X is $S(O)_mR_5$, it comprises only 1 substituent; and m is 0, 1 or 2;

or a pharmaceutically suitable salt thereof.

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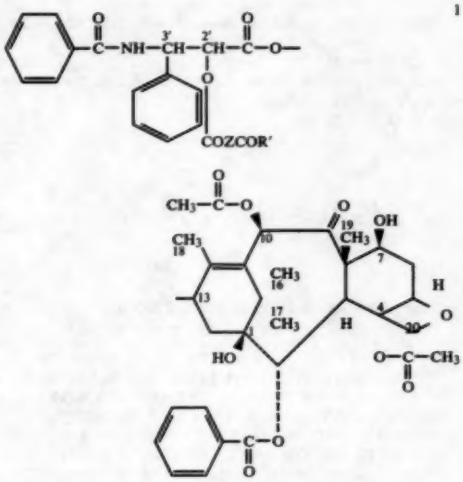
**4,942,184**

## WATER SOLUBLE, ANTINEOPLASTIC DERIVATIVES OF TAXOL

**Rudiger D. Haugwitz, Bethesda, Md.; Leon Zalkow, Atlanta, Ga.; Jan Glinski, Ridgefield, Conn.; Mathew Suffness, Silver Spring, Md.; Howard M. Deutsch, Atlanta, Ga., and Venkatachala Narayanan, Gaithersburg, Md., assignors to The United States of America as represented by the Department of Health and Human Services, Washington, D.C.**

**Filed Mar. 7, 1988, Ser. No. 165,173**
**Int. Cl.[5] A61K *31/335*; C07D *305/14***
**U.S. Cl. 514—449** **8 Claims**

1. Antineoplastic water soluble derivatives of taxol having the following formula:



1

wherein:

Z=ethylene, propylene, CHCH, 1,2-cyclohexane, 1,2-phenylene,

$R^1$=OH base, $NR^2R^3$, $OR^3$, $SR^3$, $OCH_2CONR^4R^5$, OH

$R^2$=hydrogen, methyl

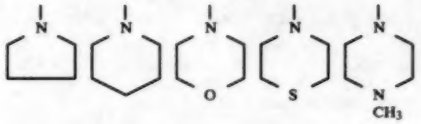
$R^3=(CH_2)_nNR^6R^7$; $(CH_2)_nNR^{\oplus 6}R^7R^8X^{\ominus}$

n=1 to 3

$R^4$=hydrogen, lower alkyl containing 1 to 4 carbons

$R^5$=hydrogen, lower alkyl containing 1 to 4 carbons, benzyl, hydroxyethyl, $CH_2CO_2H$, dimethylaminoethyl

$R^6R^7$=lower alkyl containing 1 or 2 carbons, benzyl or $R^6$ and $R^7$ together with the nitrogen atom of $NR^6R^7$ form the following rings



$R^8$=lower alkyl containing 1 or 2 carbons, benzyl

$X^{\ominus}$=halide

base=$NH_3$, $(HOC_2H_4)_3N$, $N(CH_3)_3$, $CH_3N(C_2H_4OH)_2$, $NH_2(CH_2)_6NH_2$, N-methylglucamine, NaOH, KOH.

8. A pharmaceutical composition comprising antineoplastically effective amount of the derivative of claim 1 as an active ingredient, and pharmaceutically acceptable carrier.

4,942,185

## WATER BASE PIGMENT INK COMPOSITIONS FOR USE IN MARKING PENS

Hiroshi Inoue; Wataru Yokono, and Yasuji Okuda, all of Osaka, Japan, assignors to Sakura Color Products Corp., Higashinari, Japan

Filed Nov. 9, 1989, Ser. No. 434,945
Claims priority, application Japan, Nov. 15, 1988, 63-288237
Int. Cl.[5] C08J 9/32
U.S. Cl. 521—54 7 Claims

1. A water base pigment ink composition for use in marking pens which contain an absorbent ink reservoir and a pen tip connected thereto, the ink composition comprising:

(a) water in amounts of not less than 50% by weight;

(b) an aqueous emulsion of hollow resin particles in amounts of 0.5–40% by weight as solids;

(c) a white pigment in amounts of 1–40% by weight; and

(d) a water-solubilized α-methylstyrene/styrene/acrylic acid copolymer which has a weight average molecular weight of 1000–10,000 and a distribution of molecular weight of 0.5–3.3, but which contains substantially no components having a weight average molecular weight of not more than 500, in amounts of 0.1–30% by weight, based on the ink compositions, respectively.

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4,942,186

## CONTINUOUSLY FORMING AND TRANSPORTING CONSOLIDATABLE RESIN COATED PARTICULATE MATERIALS IN AQUEOUS GELS

Joseph R. Murphey, and Kenneth D. Totty, both of Duncan, Okla., assignors to Halliburton Company, Duncan, Okla.

Division of Ser. No. 112,782, Oct. 23, 1987, Pat. No. 4,829,100.
This application Mar. 2, 1989, Ser. No. 318,105
Int. Cl.[5] C08L 5/00, 63/00; C09K 7/02
U.S. Cl. 523—131 7 Claims

1. A composition comprising:

an aqueous liquid;

a gelling agent comprising at least one member selected from galactomannon gums and derivatives thereof;

a resin composition comprising a hardenable polyepoxide resin, a hardening agent for said resin, a substantially water immiscible reactive diluent present in an amount of from about 2 to about 35 parts per 100 parts by weight of polyepoxide resin, a substantially water immiscible non-reactive diluent present in an amount of from about 4 to about 20 parts per 100 parts by weight of polyepoxide resin, a non-cationic surface active agent; and

wherein said composition is free of cationic surface active agents.

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4,942,187

## VIBRATION-DAMPING RUBBER COMPOSITION

Takashi Kawata, Mie; Hideo Katsumata, Yokkaichi; Kenya Makino, Kuwana, and Yoshishige Chikatsu, Yokkaichi, all of Japan, assignors to Japan Synthetic Rubber Company, Ltd., Tokyo, Japan

Continuation-in-part of Ser. No. 130,621, Dec. 9, 1987, abandoned. This application Feb. 23, 1988, Ser. No. 158,739
Claims priority, application Japan, Dec. 13, 1986, 61-295765; Feb. 23, 1987, 62-39609; Mar. 11, 1987, 62-55998; Mar. 30, 1987, 62-76729
Int. Cl.[5] C08L 23/20
U.S. Cl. 523—200 13 Claims

1. A vibration-damping rubber composition, comprising:

(A) about 100 parts by weight of at least one rubber component selected from the group consisting of hexene-1 homopolymers, copolymers of hexene-1 and a $C_{3-20}$ alpha-olefin other than hexene-1 and mixtures thereof wherein said rubber component is produced by polymerization in the presence of a Ziegler-Natta catalyst,

(B) about 5–150 parts by weight of a reinforcing agent,

(C) up to about 50 parts by weight of a softening agent, which is a process oil, and

(D) about 0.1-5 parts by weight of an organic peroxide crosslinking agent, and an effective amount of a crosslinking aid selected from the group consisting of sulfur, p-benzoquinone dioxime, p, p'-dibenzoylquinone dioxime, dinitrosobenzene, ethylene glycol dimethacrylate, triallyl isocyanurate, trimethylolpropane trimethacrylate, liquid polybutadiene, polybutene and polybutadiene resin.

9. The vibration-damping rubber composition according to claim 1, wherein the reinforcing agent (B) is carbon black, white carbon, basic magnesium carbonate or activated calcium carbonate.

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4,942,188

## POLYMER MIXTURE COMPRISING POLYBUTYLENE TEREPHTHALATE, AROMATIC POLYCARBONATE AND POLYDIALKYSILOXANE

Wilhelmus Jozefus L. A. Hamersma; Jan de Boer; Wilhelmus M. M. Roovers, all of Bergen op Zoom, and Gerrit de Wit, Ossendrecht, all of Netherlands, assignors to General Electric Company, Pittsfield, Mass.

Filed Nov. 9, 1988, Ser. No. 269,226
Claims priority, application Netherlands, Jan. 15, 1988, 8800083
Int. Cl.[5] C08K 9/06
U.S. Cl. 523—212 21 Claims

1. A polymer mixture consisting essentially of, (A) a polybutylene terephthalate and (B) an aromatic polycarbonate, characterized in that the polymer mixture consists essentially of 0.1–5 parts by weight of a dialkyl silicone fluid (C) per 100 parts by weight of A+B, whereby bonding is improved between a surface of an article formed from the polymer mixture and a lacquer layer applied thereto.

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4,942,189

## INTERFACIAL VISCOSIFICATION OF AQUEOUS SOLUTIONS UTILIZING INTERPOLYMER COMPLEX

Dennis G. Peiffer, East Brunswick; Robert D. Lundberg, Bridgewater, and Ilan Duvdevani, Leonia, all of N.J., assignors to Exxon Research and Engineering Company, Florham Park, N.J.

Continuation of Ser. No. 116,054, Nov. 2, 1987, abandoned. This application Jul. 31, 1989, Ser. No. 387,184
The portion of the term of this patent subsequent to Feb. 5, 2002, has been disclaimed.
Int. Cl.[5] C08K 3/00, 5/52, 53/00
U.S. Cl. 523—339 17 Claims

1. A process for forming a thickened aqueous fluid having a viscosity of at least 50 cps, which includes the steps of:

(a) forming a solvent system of a nonpolar organic liquid and a polar cosolvent, said polar cosolvent being less than about 15 weight percent of said solvent system, a viscosity of said solvent system being less than about 100 cps said polar cosolvent being selected from the group consisting of water soluble alcohols, amines, amides, and phosphates, as measured at a shear rate of 1.0 $sec^{-1}$, at a temperature of 25° C. to 75° C.;

(b) dissolving about 0.01 to about 0.5 weight percent of a water insoluble neutralized sulfonated polymer in said solvent system to form a first solution, a viscosity of said first solution being less than about 200 cps;

(c) dissolving about 0.01 to about 0.5 weight percent of a copolymer of styrene/vinylpyridine in an organic solvent t form a second solution, said copolymer of styrene/vinylpyridine having about 0.5 to 50.0 weight percent of vinylpyridine, a viscosity of said second solution being less than about 200 cps;

(d) mixing together said first solution and said second solution to form in solution a water insoluble interpolymer complex of said neutralized sulfonated polymer and said copolymer of styrene/vinylpyridine, said first solution

and said second solution being mixed in a molar ratio sufficient that the molar ratio of the sulfonate groups of said neutralized sulfonated polymer to the vinyl pyridine groups of said copolymer of styrene/vinylpyridine in said interpolymer complex is about 0.1 to about 20;

(e) adding with mixing about 5 to about 500 volume percent water to said solution of such water insoluble interpolymer complex, said water being immiscible with said solution of said water insoluble interpolymer complex, said polar cosolvent and said water insoluble interpolymer complex transferring from said organic liquid and said organic solvent to said water, causing the viscosity of said water to increase to at least 50 cps, said polar cosolvent being selected from the group consisting of water soluble alcohols, amines, amides, acetamides and phosphates, as measured at a shear rate of 1.0 $sec^{-1}$, at a temperature of 25° C. to 75° C.; and

(f) separating by decantation said water containing such polar cosolvent and said water insoluble interpolymer complex from said organic liquid and said aromatic solvent.

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4,942,190

## THERMOSETTING INSULATING RESIN PASTE

**Masakazu Murayama; Ken Kimura; Hiroyuki Nakajima; Yasuko Ohno, and Eiki Zidai, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Oct. 21, 1988, Ser. No. 262,937**

**Claims priority, application Japan, Oct. 27, 1987, 62-272670**

**Int. Cl.[5] C08L** *63/02;* **C08K** *3/34, 3/22, 3/08*

**U.S. Cl. 523—400** **20 Claims**

1. A thermosetting insulting resin paste comprising:

100 parts by weight of an epoxy resin containing a diglycidyl liquid epoxy resin as a main component;

and based on the parts by weight of said epoxy resin;

0.5 to 10 parts by weight of dicyandiamide as a setting agent;

1 to 15 parts by weight of a phenoxy resin;

0.1 to 8 parts by weight of at least one of 2-phenyl-4-methyl-5-dihydroxymethylimidazole and 2-phenyl-4,5-dihydroxymethylimidazole as a setting accelerator; and

50 to 200 parts by weight of a thermally conductive filler.

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4,942,191

## ALDEHYDE CONDENSATION RESIN GLUE COMPOSITIONS HAVING PEA AND OTHER LEGUMINOUS FLOUR EXTENDERS

**John W. Rogers, Richmond, Canada, assignor to Borden, Inc., Columbus, Ohio**

**Filed Apr. 25, 1988, Ser. No. 186,052**

**Int. Cl.[5] C08K** *5/00*

**U.S. Cl. 524—17** **29 Claims**

1. An adhesive composition comprising at least one curable aldehyde condensation resin and an extender comprising a leguminous flour wherein said leguminous flour comprises at least one pea flour.

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4,942,192

## RUBBER COMPOSITIONS FOR TIRES

**Takuo Yasuda, Tokorozawa; Hitoshi Kondo, Higashimurayama; Yoshiaki Echigo, Uji; Tsuneyuki Ohsawa, Uji, and Yoshiaki Maekawa, Uji, all of Japan, assignors to Bridgestone Corporation, Tokyo and Ltd. Unitika, Hyogo, both of, Japan**

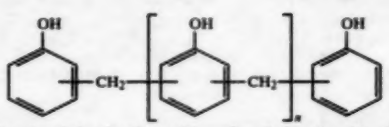
**Filed Aug. 26, 1988, Ser. No. 236,954**

**Claims priority, application Japan, Aug. 26, 1987, 62-210227**

**Int. Cl.[5] C08L** *7/00, 9/00, 9/06, 61/06*

**U.S. Cl. 524—44** **5 Claims**

1. A rubber composition for a tire comprising 2~30 parts by weight of a modified novolak resin having self-curability based on 100 parts by weight of rubber ingredient selected from the group consisting of polyisoprene rubber inclusive of natural rubber, polybutadiene rubber, styrene-butadiene copolymer rubber and a blend thereof, wherein said modified novolak resin is obtained by reacting a novolak resin represented by formula (I):



(I)

wherein n is 2~6 and a position of methylene bond to phenolic nucleus is an ortho or para site of the phenolic nucleus, with 0.5 to 50 weight % of an aldehyde in an aqueous stabilizer and 0.5 to 20 weight % of a basic catalyst.

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4,942,193

## TEMPORARY PROTECTIVE COATING COMPOSITIONS

**Elior J. Van Buskirk, and Rudolf Maska, both of Pittsburgh, Pa., assignors to PPG Industries, Inc., Pittsburgh, Pa.**

**Filed Oct. 11, 1988, Ser. No. 255,286**

**Int. Cl.[5] C08L** *91/06, 91/08*

**U.S. Cl. 524—276** **6 Claims**

1. An aqueous protective coating for a metallic substrate, said coating comprises a neutralized acid or base-functional copolymer and a lubricating composition consisting essentially of 5 to 70% by weight of a wax based on the total weight of said copolymer and said wax wherein the copolymer and wax are obtained in combination by free-radical addition polymerization of an acid or a base-functional ethylenically unsaturated monomer in a solvent in the presence of the wax.

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4,942,194

## RAPID-CRYSTALLIZING POLYPHENYLENE SULPHIDE COMPOSITIONS

**Peter Bier, Pittsburgh, Pa.; Klaus Reinking, Wermelskirchen, Fed. Rep. of Germany; Ludwig Bottenbruch, and Erhard Tresper, both of Krefeld, Fed. Rep. of Germany, assignors to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany**

**Filed Feb. 26, 1987, Ser. No. 19,016**

**Claims priority, application Fed. Rep. of Germany, Mar. 8, 1986, 3607712**

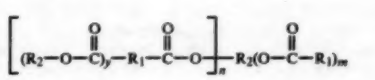
**Int. Cl.[5] C08K** *5/10, 5/11, 5/12*

**U.S. Cl. 524—281** **2 Claims**

1. A process for preparing an injection molded product prepared from highly crystalline, rapid-crystallizing, thermoplastic mixture consisting of

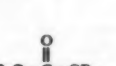
(a) 70–99.5% by weight of a polyphenylene sulphide having a melt viscosity of at least 5 Pas (measured at 306° C. under a shearing stress of $10^3$ Pa) and

(b) 0.5–30% by weight, relative to (a) and (b), of a monomeric carboxylic acid ester selected from



(I)

and



(II)

where

$R_1$ represents identical or different radicals of a linear or branched $C_1$–$C_{25}$-aliphatic, cycloaliphatic, $C_{10}$–$C_{24}$-aromatic or $C_7$–$C_{24}$-araliphatic carboxylic acid,

$R_2$ represents identical or different radicals of a linear or branched aliphatic, cycloaliphatic, araliphatic or aromatic alcohol having 1 to 20 carbon atoms,

m represents the number 0, 1, 2, 3 or 4,

n represents the number 1, when m represents the number 0,

and represents the number 0, when m represents the number 1, 2, 3 or 4 and

y represents the number 1, 2 or 3,

by the process comprising first mixing the carboxylic acid ester with the polyphenylene sulphide, when the polyphenylene is in a melt, and homogenizing the mixture in the melt, then casting the homogenized mixture into a mould which has a temperature of no more than 120° C., the amount of carboxylic acid ester being chosen in such a way that the injection-moulded polyphenylene sulphide has at least 70% of the crystallinity which is obtained in injection moulding a moulding from unmodified polyphenylene sulphide at mould temperature of at least 130° C.

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4,942,195

## TOUGHENED RUBBER BASED HOT MELT ADHESIVE COMPOSITIONS FOR BOOKBINDING APPLICATIONS

Thomas P. Flanagan, Green Brook, and Paul Puletti, Glen Gardner, both of N.J., assignors to National Starch and Chemical Investment Holding Corporation, Wilmington, Del.

Filed Aug. 17, 1988, Ser. No. 233,171

Int. Cl.[5] C08J *23/00*

U.S. Cl. 524—294 10 Claims

1. A toughened hot melt adhesive composition consisting essentially of:

(a) 10 to 40% by weight of a substantially radial styrene-butadiene block copolymer having a styrene content of at least 35% by weight, a modulus at 300% elongation of at least 4.5 MPa and a solution viscosity less than about 1000 cps;

(b) 20 to 65% by weight of a compatible tackifying resin;

(c) 0.1 to 4% by weight of a stabilizer; and

(d) the remainder of the composition, to total 100%, comprising at least one waxy diluent.

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4,942,196

## CATHODICALLY DEPOSITABLE ELECTRODEPOSITION PAINTS

Willibald Paar; Rudolf Schipfer, and Johann Gmoser, all of Graz, Austria, assignors to Vianova Kunstharz, A.G., Werndorf, Austria

Filed May 12, 1989, Ser. No. 351,072

Claims priority, application Austria, May 13, 1988, 1246/88

Int. Cl.[5] C08L *63/10*

U.S. Cl. 524—327 8 Claims

1. A water-dilutable, cathodically depositable electrodeposition paint comprising a binder, in partially or totally neutralized form, containing

(A) 70–99.5% by weight of a cationic film-forming resin, and

(B) 0.5–30% by weight of a reaction product of a tetraalkyl orthotitanate or a titanium acetyl acetonate with a compound containing at least one phenolic hydroxyl group,

with the proviso that the titanium content of the combination, based on the content of binder solids, is from 0.03 to 3.0% by weight.

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4,942,197

## RUBBER COMPOSITION FOR TIRE TREAD

Yasunori Yoshida, Hyogo; Rinichi Nakayama, and Satoshi Iwama, both of Osaka, all of Japan, assignors to Toyo Tire & Rubber Co., Ltd., Osaka, Japan

Filed May 31, 1988, Ser. No. 200,370

Claims priority, application Japan, May 28, 1987, 62-134020

Int. Cl.[5] C08K *3/04;* C08L *9/06, 15/00;* B60C *1/00*

U.S. Cl. 524—496 5 Claims

1. Rubber compositions for tire treads including at least 20 parts by weight of styrene-butadiene random copolymer and a carbon black, said styrene-butadiene random copolymer being prepared by using an organic lithium compounds as a polymerization catalyst and being coupled with a mono- or difunctional tin compound as well as a tri- or more functional compound and having a tin content of 300 ppm or more which is bonded to the polymer, said carbon black having the value of N2 SA/IA of 1.1 or more.

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4,942,198

## AQUEOUS PIGMENTED TWO-COMPONENT LACQUERS FOR SINGLE-LAYERED COATING OF FINISH FILMS AND CONTINUOUS EDGES

Karl-heinz Dickerhof, Drensteinfurt, and Gunther Schwarz, Munster, both of Fed. Rep. of Germany, assignors to Basf Lacke & Farben Aktiengesellschaft, Munster, Fed. Rep. of Germany

PCT No. PCT/EP87/00148, § 371 Date Sep. 27, 1989, § 102(e) Date Sep. 27, 1989, PCT Pub. No. WO87/05921, PCT Pub. Date Oct. 8, 1987

PCT Filed Mar. 13, 1987, Ser. No. 275,083

Claims priority, application Fed. Rep. of Germany, Mar. 29, 1986, 3610764

Int. Cl.[5] C08L *61/04*

U.S. Cl. 524—510 18 Claims

1. An aqueous two-component lacquer for single-layered coating of finish films and continuous edges, in which the first component (component (A)) contains 0.1 to 15% by weight based on the total weight of component (A), of a blocked acid as a potential hardening catalyst and 10 to 90% by weight based on the total weight of component (A), of an aqueous dispersion of a self-crosslinking polyacrylate, in which the polyacrylate contains, as the groups which facilitate self crosslinking, acid amide derivative groups having the general structural formula —CO—N—($R^1$)—CH($R^2$)—$OR^3$, in which

$R^1$=an H atom or a —CH($R^2$)—$OR^3$ grouping,

$R^2$=an H atom or a —$COOR^4$ group,

$R^3$=an H atom or a hydrocarbon radical containing 1 to 10 C atoms, and

$R^4$=an alkyl radical with 1 to 5 C atoms,

and the second component (component (B)) contains 20 to 90% by weight based on the total weight of component (B), of a melamine resin dispersed or dissolved in an aqueous medium or of a melamine/urea resin mixture dispersed or dissolved in an aqueous medium, said components (A) and (B) being mixed before application in a ratio such that 0.4 to 1.0 part by weight of melamine resin or 0.4 to 1.5 parts by weight of melamine/urea resin mixture are present per part by weight of self-crosslinking polyacrylate resin.

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4,942,199

## METHOD OF SEALING BY INJECTING A MIXTURE BASED ON ACRYLAMIDE AND THE CORRESPONDING MIXTURE

Claude Gosselin, 18 Rue de Bousbecque, 59126 Linselles, France

Filed Apr. 20, 1989, Ser. No. 340,878

Claims priority, application France, Apr. 29, 1988, 88 06075

Int. Cl.[5] C08K *5/29*

U.S. Cl. 524—724 4 Claims

1. A kit for sealing by injection comprising a first aqueous solution based on acrylamide, methylenebisacrylamide, and triethanolamide glycol and a second aqueous solution of a polymerization trigger, wherein at least one of the said solutions contains a color indicator which has a given color in the first aqueous solution and a different color in the second aqueous solution, said color indicator having a color changeover zone which corresponds to the optimum respective quantities of the two aqueous solutions for the polymerization reaction, the respective quantities of the two solutions being such that the obtained mixture takes up the color corresponding to the color of the indicator in the first aqueous solution.

## 4,942,200

## POLYAMIDE-POLYARYLATE COMPOSITION CONTAINING ELASTOMERIC MODIFIER AND EPOXY-FUNCTIONAL COPOLYMER

**Edmund A. Flexman, and James J. Sosnowski, both of Wilmington, Del., assignors to E. I. Du Pont de Nemours and Company, Wilmington, Del.**

**Continuation-in-part of Ser. No. 52,335, May 21, 1987, abandoned. This application Mar. 9, 1988, Ser. No. 165,932**

**Int. Cl.[5] C08L *67/02, 77/02***

**U.S. Cl. 525—66** **21 Claims**

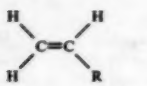
1. A polyamide/polyarylate composition consisting essentially of:

(a) 25–80 weight percent of at least one polyamide resin,

(b) 10–70 weight percent of at least one polyarylate resin,

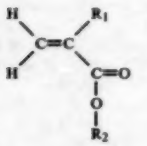
(c) 0.5–30 weight percent of at least one elastomeric modifier which is a graft polymer consisting essentially of at least one monomer containing a functional acid group and at least one substantially saturated copolymer of ethylene and $C_3$–$C_8$ alpha-olefins, and

(d) 0.5–7 weight percent of at least one epoxy functional polymer which is a copolymer comprised of at least two of the following monomers:



(a)

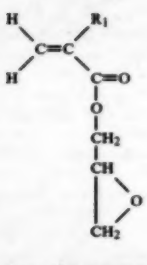
R = H, lower alkyl, phenyl



(b)

$R_1$ = H, lower alkyl

$R_2$ = alkyl of 1–8 carbons



(c)

$R_1$ = H, lower alkyl

where the monomers of formula (a) comprise 50–99 weight percent of the copolymer, the monomers of formula (b) comprise 0–40 weight percent of the copolymer, and the monomer of formula (c) comprise 1–10 weight percent of the copolymer, wherein the epoxy functional polymer and the polyarylate are blended with each other before either the epoxy functional polymer of the polyarylate are blended with either the polyamide or the elastomeric modifier.

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## 4,942,201

## ADHESIVE FOR LOW TEMPERATURE APPLICATIONS

**Paul C. Briggs, Charlestown, and Donald E. Goslewski, Peabody, both of Mass., assignors to Illinois Tool Works, Inc., Chicago, Ill.**

**Filed Aug. 29, 1988, Ser. No. 238,302**

**Int. Cl.[5] C09J *153/02, 151/04***

**U.S. Cl. 525—71** **6 Claims**

1. An adhesive composition comprising:

(a) about 55 to about 75 weight percent methyl methacrylate;

(b) 0 to about 15 weight percent methacrylic acid;

(c) about 5 to about 20 weight percent polychloroprene which is soluble in methyl methacrylate and which has a Tg below about −25° C.; and

(d) about 10 to about 30 weight percent of a core-shell graft copolymer which has a butadiene-styrene core and a methyl methacrylate shell and which swells in the monomer but does not dissolve therein, wherein said weight percents are based on the total weight of (a), (b), (c) and (d).

3. An adhesive composition comprising:

(a) about 55 to about 75 weight percent methyl methacrylate;

(b) 0 to about 15 weight percent methacrylic acid;

(c) about 5 to about 20 weight percent nitrile rubber which is soluble in methyl methacrylate and which has a Tg below about −25° C.; and

(d) about 10 to about 30 weight percent of a core-shell graft copolymer which has a butadiene-styrene core and a methyl methacrylate shell and which swells in the monomer but does not dissolve therein, wherein said weight percents are based on the total weight of (a), (b), (c) and (d).

5. An adhesive composition comprising:

(a) about 55 to about 75 weight percent methyl methacrylate;

(b) 0 to about 15 weight percent methacrylic acid;

(c) about 5 to about 20 weight percent of a block copolymer of butadiene or isoprene and styrene which is soluble in methyl methacrylate and which has a Tg below about −25° C.; and

(d) about 10 to about 30 weight percent of a core-shell graft copolymer which has a butadiene-styrene core and a methyl methacrylate shell and which swells in the monomer but does not dissolve therein, wherein said weight percents are based on the total weight of (a), (b), (c) an (d).

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## 4,942,202

## RUBBER COMPOSITION AND VULCANIZED RUBBER PRODUCT

**Yoshiaki Zama; Itsuki Umeda; Yasuhiko Takemura; Masaaki Takashima, all of Tokyo; Yuichi Funabashi, Ohta; Junichiro Watanabe, Ohta; Kiyoshi Takeda, Ohta, and Hiromichi Yoshida, Ohta, all of Japan, assignors to Japan Synthetic Rubber Co., Ltd. and Toshiba Silicon Co., Ltd., both of Tokyo, Japan**

**Filed Oct. 28, 1988, Ser. No. 263,882**

**Claims priority, application Japan, Oct. 30, 1987, 62-273470; Jul. 29, 1988, 63-188327**

**Int. Cl.[5] C08F *8/00***

**U.S. Cl. 525—104** **12 Claims**

1. A rubber composition that is prepared by reacting an organic peroxide, under shear deformation, with

3–70 parts by weight of silicone rubber (I) having the formula:

$$R_aSiO_{\frac{4-a}{2}}$$

wherein R is a substituted or unsubstituted monovalent hydrocarbon group, with 0.02–10 mol % of R being occupied by a vinyl group, a is a number ranging from 1.900–2.004 with the silicone rubber having a polymerization degree of 500–10,000;

30–97 parts by weight of a saturated elastomer (II) that does not have sites for crosslinking with an organic peroxide, and therefore substantially fails to be crosslinked even if the silicone rubber (I) is crosslinked with the organic peroxide; and

0–20 parts by weight of another elastomer (III) that is co-crosslinkable with component (I) in the presence of an organic peroxide and which is also co-crosslinkable or highly miscible with component (II), the sum of (I)+(II)+(III) being 100 parts by weight of the composition.

4,942,203

## POLYMER COMPOSITIONS

John N. Conti-Ramsden, Wellesley, Mass.; Robert A. Head, Upton; Richard L. Powell, Tarporley, and Brian D. Young, Winsford, all of England, assignors to Imperial Chemical Industries PIC, London, England

Filed Jul. 11, 1988, Ser. No. 217,226

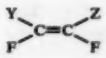
Claims priority, application United Kingdom, Jul. 9, 1987, 8716198

Int. Cl.[5] C08L 71/00, 27/12; C08F 232/02

U.S. Cl. 525—185 7 Claims

1. A polymer composition comprising:

(1) a polyether polyol which is a product obtained by the free radical addition of a fluoro-olefin of the general formula:



wherein Y represents F or fluoroalkyl and Z represents Cl or $F(CF_2)_m$— wherein m is an integer from 0 to 10 or Y and Z together form a $(CF_2)_p$— chain wherein p represents an integer from 2 to 4, to a polytetramethylene glycol having a molecular weight is the range 162 to 5000 and

(2) at least one acrylic polymer.

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4,942,204

## AMPHIPHILIC NETWORKS

Joseph P. Kennedy, Akron, Ohio, assignor to The University of Akron, Akron, Ohio

Filed Aug. 15, 1988, Ser. No. 232,444

Int. Cl.[5] C08F 255/08

U.S. Cl. 525—293 9 Claims

1. An amphiphilic copolymer network swellable in water or n-heptane but insoluble in either, composed of a polymeric product of reaction of an acrylate or methacrylsyr of dialkyl amino alkyl with a hydrophobic bifunctional acryloyl or methacryloyl capped polyolefin.

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4,942,205

## ALPHA-FLUOROACRYLIC ACID POLYMER AND ITS USE

Akira Ohmori, Ibaraki, and Takashi Yasuhara, Settsu, both of Japan, assignors to Daikin Industries, Ltd., Osaka, Japan

Division of Ser. No. 152,296, Feb. 4, 1988, Pat. No. 4,871,820.

This application Jun. 6, 1989, Ser. No. 362,041

Claims priority, application Japan, Feb. 17, 1987, 62-35401

Int. Cl.[5] C08F 14/18

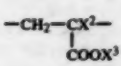
U.S. Cl. 525—326.2 1 Claim

1. A pervaporation membrane made of an α-fluoroacrylic acid polymer comprising:

(1) about 5 to about 100% by weight of a structural unit represented by the formula

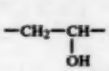
wherein $X^1$ is (i) carboxyl group optionally converted to alkali metal salt, calcium salt, magnesium salt, zinc salt, iron salt, nickel salt, mercury salt, copper salt, cadmium salt, ammonium salt or $C_1$–$C_{20}$ alkyl group-containing primary or tertiary amine salt, or (ii) a group —$CONR^4R^5$ (wherein $R^4$ is hydrogen or $C_1$–$C_{20}$ alkyl group and $R^5$ is hydrogen, $C_1$–$C_{20}$ hydroxyalkyl group, $C_1$–$C_{20}$ alkyl group containing sulfone group or carboxyl group whereby both could be converted to alkali metal salt, or a group —$R^7NHR^8$·$HY^2$);

(2) 0 to about 95% by weight of a structural unit represented by the formula



wherein $X^2$ is hydrogen, fluorine or methyl and $X^3$ is $C_1$–$C_{10}$ alkyl group or $C_2$–$C_{10}$ fluoroalkyl group (provided that the group could contain 1 to 3 oxygen atoms in the carbon atom chain); and

(3) 0 to about 95% by weight of a structural unit represented by the formula



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4,942,206

## BLENDS AND COPOLYMERS OF POLYETHERIMIDE AND FUNCTIONALIZED POLYPHENYLENE ETHER

Dwain M. White, Schenectady; Laura A. Socha, Troy, both of N.Y., and Roelof Van Der Meer, AZ Bergan op Zoom, Netherlands, assignors to General Electric Company, Schenectady, N.Y.

Filed Jun. 21, 1988, Ser. No. 209,447

Claims priority, application Netherlands, Jul. 6, 1987, 8701585

Int. Cl.[5] C08L 71/12

U.S. Cl. 525—397 6 Claims

1. A polyphenylene oxide-polyetherimide copolymer comprising anhydride-functionalized polyphenylene oxide and amine-terminated polyetherimide.

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4,942,207

## PROCESS FOR THE PREPARATION OF MODIFIED RESIN USEFUL AS A LOW-STRESS SEMICONDUCTOR ENCAPSULANT AND COMPOSITION FORMED THEREFROM

Jung D. Lee; Chang J. Yoo, and Moon Y. Lee, all of Suwon, Rep. of Korea, assignors to Korea Chemical Co., Ltd., Kyungsangnam, Rep. of Korea

Continuation of Ser. No. 160,347, Feb. 25, 1988, abandoned.

This application Jul. 24, 1989, Ser. No. 384,093

Claims priority, application Rep. of Korea, Oct. 31, 1987, 87-12192

Int. Cl.[5] C08F 283/00

U.S. Cl. 525—476 13 Claims

1. A process for the preparation of a modified resin useful as a semiconductor encapsulant, which comprises the steps of:

reacting in a water medium a silicone oil or a silicone resin having at least two silanol groups or hydrolyzable alkoxy groups with a silane coupling agent having at least two hydrolyzable alkoxy groups to form an aqueous suspension of a reactive intermediate product,

azeotropically distilling said suspension to form a distilled intermediate product after removing water or alcohol, and

reacting with said distilled intermediate product (1) an epoxy resin being a chemical selected from the group consisting of a bisphenol A epoxy resin, a phenol novolac epoxy resin, and a cresol novolac epoxy resin or (2) a phenol resin being a chemical selected from the group consisting of a novolac phenol resin and a cresol novolac phenol resin to produce an addition product comprising insoluble and infusible spherical particles in a matrix.

4,942,208

## POLYACETAL LIGHTER BODY RESIN

Alex S. Forschirm, Parsippany, and Jon H. Davies, Chatham, both of N.J., assignors to Hoechst Celanese Corporation, Somerville, N.J.

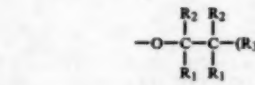
Continuation-in-part of Ser. No. 878,919, Jun. 26, 1986, abandoned. This application Sep. 7, 1988, Ser. No. 241,389

Int. Cl.[5] C08L 59/00, 61/00; F23Q 2/02

U.S. Cl. 525—414 15 Claims

1. A molding composition comprising a blend of two oxymethylene copolymers, said blend comprising 50 to 85% by weight of an oxymethylene copolymer having a melt index of 27.0 grams/10 minutes and from about 15 to 50 wt. % of an oxymethylene copolymer having a melt index of 9.0 grams/10 minutes,

each of said copolymers comprising a majority of recurring —$OCH_2$— groups interspersed with a minor amount of groups of the formula:



wherein each $R_1$ and $R_2$ is selected from the group consisting of hydrogen, lower alkyl and halogen-substituted lower alkyl radicals, each $R_3$ is selected from the group consisting of methylene, oxymethylene, lower alkyl and haloalkyl-substituted methylene, and lower alkyl and haloalkyl-substituted oxymethylene radicals, and n is an integer from zero to three inclusive.

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4,942,209

## ANIONIC POLYMERIZATION IN HIGH VISCOSITY DISPERSING MEDIUM TO FORM MICROPARTICLES WITH NARROW SIZE DISTRIBUTION

Binaur Z. Gunesin, New York, N.Y., assignor to Mobil Oil Corporation, New York, N.Y.

Continuation-in-part of Ser. No. 134,731, Dec. 18, 1987, abandoned. This application Feb. 14, 1989, Ser. No. 311,003

Int. Cl.[5] C08F 2/14, 4/48

U.S. Cl. 526—173 20 Claims

1. A process for the polymerization of an anionically polymerizable vinyl aromatic monomer to obtain a particle size distribution(Dw/Dn) or 1.2 or less by conducting the polymerization at a temperature of 0° to 25° C. in the presence of an anionic polymerization catalyst in a dispersing medium having a viscosity of at least about 2.0 cp at 20° C. which is not a solvent for the polymerized monomer, said dispersing medium containing a dispersing agent which is an A-B diblock copolymer wherein the A block is styrene and the B block is butadiene, isoprene or hydrogenated isoprene.

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4,942,210

## BRANCHED ISOOLEFIN POLYMER PREPARED WITH ADAMANTANE CATALYST SYSTEM

Irving Kuntz, Linden, N.J., assignor to Exxon Chemical Patents Inc., Linden, N.J.

Division of Ser. No. 826,244, Feb. 5, 1986, Pat. No. 4,711,866. This application Aug. 24, 1987, Ser. No. 88,251

Int. Cl.[5] C08F 4/14, 10/10, 36/08

U.S. Cl. 526—348.7 7 Claims

1. An isoolefin polymer having the structural formula:

wherein AD represents an adamantyl nucleus, M is an isoolefin polymer moiety and n is an integer from 2 to 4, wherein said polymer is prepared using a catalyst system comprising a bromo- or chloro- adamantane and a Lewis acid.

4,942,211

## ORGANOPOLYSILOXANE COMPOSITIONS WHICH CAN BE CROSSLINKED TO FORM ELASTOMERS WITH THE ELIMINATION OF ALCOHOLS

Oswin Sommer, Burghausen; Norman Dorsch, Post Burghausen; Erhard Bosch, Burgkirchen, and Alfred Kurz, Burghausen, all of Fed. Rep. of Germany, assignors to Wacker-Chemie GmbH, Munich, Fed. Rep. of Germany

Filed Jan. 6, 1989, Ser. No. 293,909

Claims priority, application Fed. Rep. of Germany, Jan. 19, 1988, 3801389

Int. Cl.[5] C08G 77/06

U.S. Cl. 528—14 11 Claims

1. A process for stabilizing an organopolysiloxane composition which can be crosslinked at room temperature with the elimination of an alcohol, which comprises adding a salt of a metal with a branched-chain carboxylic acid having from 5 to 15 carbon atoms, in which the metal is selected from the group consisting of magnesium, calcium, barium, strontium and zinc, to an organopolysiloxane having R' groups and SiC-bonded alkyl radicals which are substituted with radicals selected from the group consisting of amino, mercapto, acryloxy, methacryloxy, epoxy, allyl and cyclohexenyl groups linked to the terminal silicon atoms, where R' is selected from the group consisting of monovalent hydrocarbon radicals having from 1 to 10 carbon atoms and monovalent hydrocarbon radicals having from 1 to 10 carbon atoms which are substituted by $C_1$ to $C_3$ alkoxy groups.

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4,942,212

## POLYURETHANE RESIN AND HEAT-SENSITIVE RECORDING MEDIUM

Kazuyuki Hanada, Washinomiyo; Kohichi Kuroda, Tokyo; Iwao Misaizu, Ageo; Masashi Kashimura, Tokyo; Tomoko Goto, Kawaguchi, and Katsumi Kuriyama, Koshigaya, all of Japan, assignors to Dainichiseika Color & Chemicals Mfg. Co., Ltd. and Ukima Colour & Chemicals Mfg. Co., Ltd., both of Tokyo, Japan

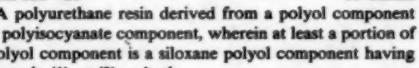
Filed Dec. 6, 1988, Ser. No. 280,583

Claims priority, application Japan, Jan. 20, 1988, 63-8234

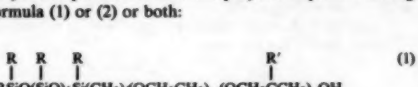
Int. Cl.[5] C08G 77/04

U.S. Cl. 528—28 10 Claims

1. A polyurethane resin derived from a polyol component and a polyisocyanate component, wherein at least a portion of the polyol component is a siloxane polyol component having the formula (1) or (2) or both:



(1)



(2)

wherein R is an alkyl group, R' is hydrogen or a $C_1$–$C_5$ alkyl group, k, l and m are integers of 1–250, 0–5 and 0–15, respectively, and n is an integer of 1–3 in formula (1) and an integer of 2–3 in formula (2), said siloxane polyol component being present in an amount sufficient to provide said polyurethane resin with tack-free and anti-blocking properties, while retaining resin flexibility.

4,942,213

## ADDITION COMPOUNDS USEFUL AS DISPERSING AGENTS AND DISPERSION STABILIZERS, PROCESS FOR PRODUCING THEM, THEIR USE AND SOLIDS COATED THEREWITH

Karl-Heinz Haubennestel, and Wolfgang Pritschins, both of Wesel, Fed. Rep. of Germany, assignors to BYK-Chemie GmbH, Wesel, Fed. Rep. of Germany

Filed Nov. 30, 1988, Ser. No. 278,112

Claims priority, application Fed. Rep. of Germany, Dec. 4, 1987, 3741182

The portion of the term of this patent subsequent to Jan. 3, 2006, has been disclaimed.

Int. Cl.[5] C08G 18/28

U.S. Cl. 528—28 28 Claims

1. An addition compound or salt thereof useful as a dispersing agent or dispersion stabilizer obtained by

(a) reacting a polyisocyanate having an average functionality of 2.5 to 10 with a monohydroxy compound of formula I

$$Y\text{-}OH \qquad I$$

in which Y represents

(i) an aliphatic or cycloaliphatic hydrocarbon group having 8 to 30 carbon atoms in which hydrogen atoms may be partly replaced by halogen or aryl substituents, or

(ii) an aliphatic, cycloaliphatic or aromatic group containing at least one —O— or —COO— group, having an average molecular weight $M_n$ of 200 to 10,000, and in which hydrogen atoms may be partly replaced by halogen,

in an amount sufficient to react 10 to 70% of the isocyanate groups originally present in the isocyanate;

(b) reacting with a compound of formula II

$$G\text{-}(E)_n \qquad II$$

in which

E represents at least one of —OH, —$NH_2$ and —NHR in which R is an alkyl group having 1 to 4 carbon atoms,

n represents 2 or 3, and

G represents an aliphatic, cycloaliphatic and/or aromatic group containing at least 2 carbon atoms, having an average molecular weight $M_n$ of not more than 3000, and which may contain at least one group selected from the group consisting of —O—, —COO—, —CONH—, —S— and —$SO_2$—,

in an amount sufficient to react 1 to 50% of the isocyanate groups originally present in the isocyanate, and to react a total of 20 to 85% of the isocyanate groups originally present in the polyisocyanate in stages (a) and (b); and

(c) reacting with a compound of formula III

$$Z\text{—}(CH_2)_p\text{—}Q \qquad III$$

in which

Q represents —OH, —SH, —$NH_2$ or —NHR in which R is an alkyl group having 1 to 4 carbon atoms,

Z represents an aliphatic group having 2 to 10 C atoms and carrying at least one tertiary amino group or represents a heterocyclic group having at least one basic ring nitrogen atom not bonded to a hydrogen atom, and

p is 0 when Z is an aliphatic group or an integer from 0 to 10 when Z is a heterocyclic group,

in an amount sufficient to provide at least one molecule of formula III for each isocyanate group in the polyisocyanate unreacted after stages (a) and (b);

wherein

at least 1 mole % of the compound of formula I defined above is replaced by a compound of formula Ia

$$Y'\text{—}OH \qquad Ia$$

in which Y' represents an aliphatic, cycloaliphatic or aromatic group having an average molecular weight $M_n$ of 200 to 10,000 in which hydrogen atoms may be partly replaced by halogen and containing at least one —NHCOO— group, or

at least 1 mole % of the compound of formula I defined above is replaced by a monohydroxyfunctional polyacrylic or polymethacrylic acid ester or a copolymer thereof with up to 50 mole % relative to monomer units of a vinyl comonomer, having an average molecular weight $M_n$ of not more than 10,000, or

at least 1 mole % of the compound of formula II defined above is replaced by a compound of formula IIa

$$G'\text{—}(OH)_n \qquad IIa$$

in which G' represents an aliphatic, cycloaliphatic or aromatic group containing at least 2 carbon atoms, having an average molecular weight $M_n$ of not more than 3000, and containing at least one —NHCOO— or —$Si(CH_3)_2O$— group, and n represents a number from 2 to 3.

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4,942,214

## FLEXIBLE BREATHABLE POLYURETHANE COATINGS AND FILMS, AND THE PREPOLYMERS FROM WHICH THEY ARE MADE

Dilip J. Sakhpara, Newark, Del., assignor to W. L. Gore & Assoc. Inc., Newark, Del.

Filed Jun. 29, 1988, Ser. No. 213,059

Int. Cl.[5] C08G 18/10

U.S. Cl. 528—59 7 Claims

1. Low viscosity, low freezing point isocyanate-capped prepolymers for making breathable coatings and films comprising the reaction product of:

(a) a difunctional poly(oxyalkylene) glycol with a molecular weight between 1000 and 4000, said difunctional poly(oxyalkylene) glycol being a random copolymer of ethylene oxide and propylene oxide added to ethylene glycol, propylene glycol or 1, 4-butanediol; the oxyethylene content of the difunctional poly(oxyalkylene) glycol being between 60% and 95% by weight, and

(b) a polyisocyanate with a functionality between 2.0 and 2.2, said polyisocyanate being selected from the class consisting of diphenyl methane diisocyanate and dicyclohexyl methane diisocyanate.

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4,942,215

## THERMOSETTING LIQUID COMPOSITION CONTAINING A POLYEPOXIDE AND A TRICARBOXYLIC ISOCYANURATE

Alberto Greco, Dresano, and Luigi Raisa, Induno Olona, both of Italy, assignors to Enichem Synthesis S.p.A., Palermo, Italy

Filed Nov. 18, 1988, Ser. No. 273,358

Claims priority, application Italy, Nov. 27, 1987, 22788 A/87

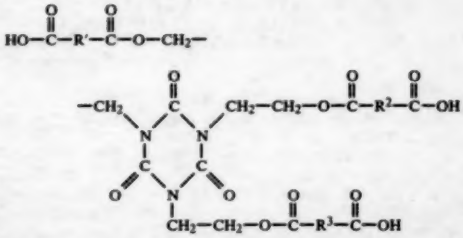
Int. Cl.[5] C08G 59/42

U.S. Cl. 528—114 9 Claims

1. A thermosetting liquid molding composition comprising:

(a) a liquid polyepoxide containing at least two epoxide groups per molecule;

(b) a liquid tricarboxylic acid having the formula



where: $R^1$, $R^2$ and $R^3$, which can be identical or different, independently are selected from the group consisting of an alkylene group containing from 1 to 14 carbon atoms; an alkenyl group containing from 2 to 14 carbon atoms; an unsubstituted monocyclic or bicyclic alkylene or alkenyl group having from 6 to 10 carbon atoms in the ring; a monocyclic or bicyclic alkylene or alkenyl group having from 6 to 10 carbons in the ring substituted with at least one alkyl group; a phenylene group; or a phenylene group substituted with at least one halogen atom; and

(c) a liquid anhydride of a dicarboxylic acid selected from methyltetrahydrophthalic anhydride, methylnadic anhydride and dodecenylsuccinic anhydride; wherein for each epoxide equivalent of component (a) said composition contains from 0.04 to 0.09 equivalents of said tricarboxylic acid (b) and from 0.48 to 0.82 moles of said anhydride (c).

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**4,942,216**

## POLYARYL ETHER KETONES HAVING IMPROVED PROCESSIBILITY

**Gerhard Heinz, Weisenheim; Robert R. Lieder, Limburgerhof, and Juergen Koch, Neuhofen, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

**Filed Feb. 10, 1989, Ser. No. 308,525**

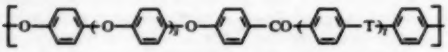
**Claims priority, application Fed. Rep. of Germany, Feb. 11, 1988, 3804159**

**Int. Cl.[5] C08G *8/02, 14/00***

**U.S. Cl. 528—125** **8 Claims**

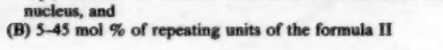
1. A polyaryl ether ketone essentially consisting of

(A) 55–95 mol % of repeating units of the formula I



where s and t are each 0, 1, 2 or 3 and Q and T are each —O— or —CO—, or their $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy, aryl, chlorine or fluorine derivatives substituted in the nucleus, and

(B) 5–45 mol % of repeating units of the formula II



where $Ar^1$, $Ar^2$, $Ar^3$, $Ar^4$ and $Ar^5$ independently of one another are each a phenylene, biphenylene or naphthylene group or a $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy, aryl, chlorine or fluorine derivative of this group, Q' and T' are each —O— or —CO— and s' and t' are each 0, 1, 2 or 3, with the proviso that one or more of the groups $Ar^1$, $Ar^2$, $Ar^3$, $Ar^4$ and $Ar^5$ are a biphenylene or naphthylene group or a $C_1$–$C_6$-alkyl, $C_1$–$C_6$-alkoxy, aryl, chlorine or fluorine derivative of such a group and, if $Ar^1$ is a biphenylene group, all parameters s, t, s' and t' are not simultaneously 0.

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**4,942,217**

## NOVEL HEAT-HARDENABLE BINDERS PHENOL-FORMALDEHYDE + HMT + ACID

**Arno Gardziella, Witten-Rudinghausen, and Alois Kwasniok, Iserlohn, both of Fed. Rep. of Germany, assignors to Rutgerswerke AG, Fed. Rep. of Germany**

**Filed Oct. 26, 1988, Ser. No. 263,066**

**Claims priority, application Fed. Rep. of Germany, Nov. 17, 1987, 3738902**

**Int. Cl.[5] C08G *8/10, 14/04;* C08F *6/22;* C08K *5/42***

**U.S. Cl. 528—129** **21 Claims**

1. A heat-hardenable binder comprising (a) a phenolic resin of a phenolic compound and formaldehyde in a molar ratio of 1:1 to 1:2 and (b) an effective amount of a hardener mixture of hexamethylenetetramine and an acidic latent hardening agent.

**4,942,218**

## PROCESS FOR THE PREPARATION OF POLYMERS HAVING AN INORGANIC BACKBONE

**William A. Sanderson, Menlo Park, and David L. King, Mountain View, both of Calif., assignors to Catalytica Associates, Inc., Mountain View, Calif.**

**Filed May 23, 1988, Ser. No. 197,459**

**Int. Cl.[5] C08G *67/00, 79/04***

**U.S. Cl. 528—381** **24 Claims**

1. A method of making an polymer which comprises:

(a) reacting, in the absence of water, an organic compound having the general formula R—H wherein R represents an organo radical having at least one unsaturated carbon-carbon bond and H is covalently bonded to one of said carbons, with $PX_3$, wherein X is a halogen atom, further provided that R is selected from the group consisting of hydrocarbyl radicals and hetero-atom-containing hydrocarbyl radicals, wherein the heteroatom substituents do not interfere with the di halo-phosphination reaction of step (a), and a Zr compound, to yield a reaction product and (b) oxidizing and (c) hydrolyzing the reaction product of step (a) to yield a polymer represented by the general formula $Zr(O_3PR)_n$ wherein n varies from about 1 to about 2.5.

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**4,942,219**

## VISCOELASTIC RESIN FOR VIBRATION DAMPING MATERIAL AND COMPOSITION CONTAINING THE SAME

**Takeshi Yatsuka; Seiji Yamazoe; Hiroshi Hirakouchi; Yutaka Mizumura, all of Osaka; Hiroshi Endo, and Nobuo Kadowaki, both of Sagamihara, all of Japan, assignors to Toyo Boseki Kabushiki Kaisha, Osaka and Nippon Steel Corporation, Tokyo, both of, Japan**

**Filed Oct. 20, 1988, Ser. No. 260,303**

**Claims priority, application Japan, Oct. 20, 1987, 62-264819**

**Int. Cl.[5] C08G *63/02***

**U.S. Cl. 528—272** **15 Claims**

1. In a vibration damping material of composits laminate structure containing a resin middle layer, the improvement which comprises inclusion of an amorphous block copolyester resin as said resin middle layer, wherein properties of the amorphous block copolyester resin include no clear melting peak appearing in measurement by differential scanning calorimetry of the amorphous block copolyester resin at a temperature rising rate of 10° C./minute in a nitrogen atmosphere, and a reduced viscosity not less than 0.4 dl/g.

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**4,942,220**

## PROCESS FOR PREPARING POLY-AMIDE FROM NITRILE AND AMINE WITH CATALYTIC COMPLEX

**Shunichi Murahashi, Ikeda, and Takeshi Naota, Kawanishi, both of Japan, assignors to Osaka University, Suita, Japan**

**Division of Ser. No. 838,199, Mar. 7, 1986, Pat. No. 4,801,748, which is a continuation-in-part of Ser. No. 828,245, Feb. 11, 1986, abandoned. This application Jun. 19, 1987, Ser. No. 67,414**

**Claims priority, application Japan, Mar. 8, 1985, 60-44939**

**Int. Cl.[5] C08G *69/28***

**U.S. Cl. 528—336** **11 Claims**

1. A process for preparing a polyamide from a carbonitrile and an amine which comprises reacting by heating a mixture of a carbonitrile, an equivalent amount of an amine, which amine is a primary amine or a secondary amine, and at least a stoichiometric amount of water in the presence of an effective amount of a catalyst,

wherein said carbonitrile is a dinitrile represented by the general formula:

$R^4(CN)_2$,

where $R^4$ denotes a bivalent residue of:

a. a saturated aliphatic hydrocarbon;
b. an unsaturated aliphatic hydrocarbon;
c. a group derived from a saturated aliphatic hydrocarbon or an unsaturated aliphatic hydrocarbon by substituting an aromatic group, a heterocyclic ring -containing group, or a heteroatom-containing group for one hydrogen atom thereof;
d. an alicyclic hydrocarbon;
e. an aromatic hydrocarbon;
f. a heterocyclic compound; or
g. a group consisting of two aliphatic hydrocarbon moieties bridged by an aromatic group, heterocyclic group, or a heteroatom,

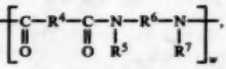
wherein said amine is a diamine represented by the general formula:

$$HN(R^5)—R^6—(R^7)NH,$$

where $R^5$ and $R^7$ are the same or different and, respectively, denote a hydrogen atom or a monovalent residue of:

a. a saturated aliphatic hydrocarbon;
b. an unsaturated aliphatic hydrocarbon;
c. a group derived from a saturated aliphatic hydrocarbon or an unsaturated aliphatic hydrocarbon by substituting an aromatic group for one hydrogen atom thereof;
d. an alicyclic hydrocarbon;
e. an aromatic hydrocarbon;
f. a heterocyclic compound; or
g. an aliphatic hydrocarbon having a heterocyclic ring-containing substituent or a heteroatom-containing substituent, and where $R^6$ denotes a bivalent residue of:
a. a saturated aliphatic hydrocarbon;
b. an unsaturated aliphatic hydrocarbon;
c. a group derived from a saturated aliphatic hydrocarbon or an unsaturated aliphatic hydrocarbon by substituting an aromatic group, a or heterocyclic ring-containing group, or a heteroatom-containing group for one hydrogen atom thereof;
d. an alicyclic hydrocarbon;
e. an aromatic hydrocarbon;
f. a heterocyclic compound; or
g. a group consisting of two aliphatic hydrocarbon moieties bridged by an aromatic group, a heterocyclic group, or a heteroatom, and

wherein said polyamide has a recurring unit represented by the general formula:



where w is an interger, and

wherein said catalyst is comprised of a complex containing at least one metal selected from the group consisting of ruthenium, rhodium and molybdenum, and at least one group selected from the group consisting of hydride, phosphine, carbonyl, ammonia, and hydroxyl.

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**4,942,221**

## PROCESS FOR OBTAINING α-AMINO NITRILES AND THEIR APPLICATIONS TO ORGANIC SYNTHESIS

**Gerard Moinet, Orsay, and Thierry Imbert, Noisy le Roi, both of France, assignors to Albert Rolland S.A., Paris, France**

**PCT No. PCT/FR86/00391, § 371 Date Aug. 4, 1987, § 102(e) Date Aug. 4, 1987, PCT Pub. No. WO87/02980, PCT Pub. Date May 21, 1987**

**PCT Filed Nov. 19, 1986, Ser. No. 86,731**

**Claims priority, application France, Nov. 19, 1985, 85 17214**

**Int. Cl.[5] C07C *253/30, 253/08***

**U.S. Cl. 558—408** **8 Claims**

1. A process for obtaining a α-amino nitrile of the formula

I

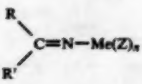
wherein R is a substituted or unsubstituted alkyl of 1 to 30 carbon atoms, a mono- or bicyclic aryl, an alkenyl of 2 to 30 carbon atoms, an aryl arylalkyl in which the alkyl moiety has from 1 to 15 carbon atoms, an aryloxy lower alkyl unsubstituted or substituted by one to three substituents on the aryl moiety or a cycloalkyl of 4 to 7 carbon atoms and R′ is hydrogen or an organo selected from the group consisting of unsubstituted or substituted alkyl of 1 to 3 carbon atoms and a mono- or bicyclic aromatic comprising reacting a nitrile selected from the groups consisting of an alkyl nitrile having 1 to 30 carbon atoms, an alkenyl nitrile of 2 to 30 carbon atoms and an aryl nitrile selected from the group consisting of mono-cyclic aryl nitrile and bicyclic aryl nitrile, an arylalkyl nitrile in which the alkyl moiety has from 1 to 15 carbon atoms, an aryloxy lower alkyl nitrile unsubstituted or substituted by one to three substituents on the aryl moiety or a cycloalkyl nitrile of 4 to 7 carbon atoms comprising reacting a compound of formula

$$R—C≡N \qquad II$$

wherein R has the above-given meaning with a metallic reducing agent selected from the group consisting of an aluminum hydride, an organo magnesium salt of the formula R′ Mg X wherein R′ is an unsubstituted or substituted alkyl of 1 to 30 carbon atoms or a mono- or bicyclic aryl, an organozinc salt of the formula

$$Hal—Zn—R'$$

wherein R′ is defined as previously given and Hal and X are a halogen atom other than fluorine, organo cadmium salt and organo cooper sale to form a metallic imine of the formula



III

in which R and R′ have the previously-given definitions, Me is a metal atom selected from the group consisting of aluminum, magnesium, zinc, cadmium and copper, Z is lower alkyl or halogen and n is an integer equal to the valence of the metal less one, reacting the latter with a cyaniding agent selected from the group consisting of methylsilyl cyanide, diethylaluminum cyanide, tributylstannicyanide and alkali- or alkaline-earth metal cyanoborohydride, an alkali metal cyanide in the presence of a Crown Ether and hydrocyanic acid in solution in an oxygen-bearing solvent and recovering the corresponding α-amino nitrile of formula I.

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**4,942,222**

## METHOD FOR REMOVING ODOR COMPONENTS FROM POLYPHENYLENE ETHER RESINS WITH KETONE

**Dwain M. White, Schenectady, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Feb. 6, 1989, Ser. No. 306,132**

**Int. Cl.[5] C08G *65/46***

**U.S. Cl. 528—493** **12 Claims**

1. A method for removing odor components from polyphenylene ether resins, comprising extracting a polyphenylene ether resin with a ketone in an amount ranging from about 2 to about 10 millimeters of ketone per gram of polyphenylene ether resin.

4,942,223

## PROCESS FOR SEPARATING A POLYMER FROM A SOLUTION CONTAINING THE SAME

Hiroyoshi Takao, Chiba; Yoshio Inoue, Kimitsu, and Hirotami Yamazaki, Ichihara, all of Japan, assignors to Sumitomo Chemical Company Limited, Osaka, Japan

Filed Sep. 8, 1983, Ser. No. 530,358

Claims priority, application Japan, Sep. 14, 1982, 59-160515

The portion of the term of this patent subsequent to Oct. 17, 2004, has been disclaimed.

Int. Cl.[5] C08F 6/00; C08G 6/00; C08J 3/00

U.S. Cl. 528—501 16 Claims

1. In the step to recover a polymer from a solution containing below 50% the same, a process for separating the solution into the solvent and a more concentrated polymer solution containing not less than 50% by weight of the polymer, which process is characterized by heating the polymer solution at a temperature at which the polymer remains in the thermally stable state; heating a solvent containing none of the polymer at a temperature higher than the heating temperature for the said polymer solution; and joining the thus heated solution and the thus heated solvent, both in liquid state, together for a flash evaporation.

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4,942,224

## A-ASSOCIATED H-ANTIGENS, MONOCLONAL ANTIBODIES SPECIFIC THERETO AND METHODS FOR EMPLOYING THE SAME IN BLOOD TYPING

Henrik Clausen, Seattle, Wash., assignor to The Biomembrane Institute, Seattle, Wash.

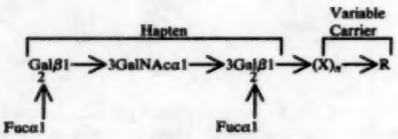
Division of Ser. No. 2,467, Jan. 12, 1987, Pat. No. 4,857,639.

This application Apr. 27, 1989, Ser. No. 343,566

Int. Cl.[5] C08B 37/00; C07H 1/00, 3/00; A61K 37/00

U.S. Cl. 530—387 24 Claims

1. A monoclonal antibody having binding specificity for the hapten of the A-associated H-antigen having the following structure:




wherein X is a sugar residue and n=0 or a positive integer and wherein R is a primary amino group containing material selected from the group consisting of a polypeptide, a primary amino group containing lipid or a primary amino group containing support.

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4,942,225

## PREPARATION OF DIAZO AND AZO COMPOUNDS USING AZIDOFORMAMIDIUM SALTS

Manfred Lorenz, Cologne, Fed. Rep. of Germany, assignor to Bayer Aktiengesellschaft, Leverkusen, Fed. Rep. of Germany

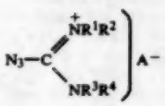
Filed Jun. 20, 1988, Ser. No. 209,254

Claims priority, application Fed. Rep. of Germany, Jul. 2, 1987, 3721851

Int. Cl.[5] C07C 247/04; C09B 27/00; C07D 239/62

U.S. Cl. 534—560 14 Claims

1. A process of preparing diazo compounds comprising a transfer of diazo groups to activated methylene compounds comprising reacting an activated methylene compound with a diazo transferring agent, wherein the diazo transferring agent is an azidoformamidinium salt of the formula



in which $R^1$, $R^2$, $R^3$, $R^4$ denote hydrogen, alkyl, cycloalkyl, aralkyl or wherein $R^1+R^2$, $R^3+R^4$ and $R^2+R^3$ form a 5- or 6-membered ring including the N atom and $A^-$ stands for an anion, said transfer being conducted at a temperature of 0° to 100° C. with from an equimolar amount to an excess amount of the azidoformamidinium salt and in the presence of a solvent suitable for diazo transfer.

12. A process of preparing azo compounds of the formula

D—N=N—A (IV)

in which

A denotes the radical of the coupling component and

D denotes the radical of an activated methylene compound, comprising reacting an activated methylene compound with an azidoformamidinium salt to give, by azo group transfer, a diazo compound which is subsequently reacted with a coupling component H—A to give azo compounds of the formula IV.

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4,942,226

## HALOGENATED PYRIMIDINE NUCLEOSIDES AND THEIR DERIVATIVES

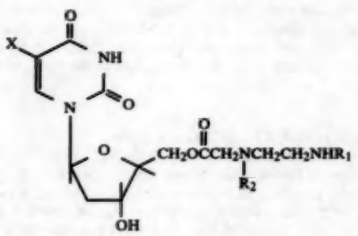
Walfred S. Saari, Lansdale, Pa., assignor to Merck & Co., Inc., Rahway, N.J.

Filed Dec. 29, 1988, Ser. No. 291,714

Int. Cl.[5] C07H 19/073; A61K 31/505, 31/195, 31/215

U.S. Cl. 536—23 9 Claims

1. A compound of the formula:




I

wherein

X is a halogen;

$R_1$ is hydrogen, a $C_1$–$C_6$ alkyl group, or a $C_5$–$C_7$ cycloalkyl ethyl group; and

$R_2$ is hydrogen or a $C_1$–$C_6$ alkyl group.

4,942,227

## BIFUNCTIONAL MOLECULES HAVING A DNA INTERCALATOR OR DNA GROOVE BINDER LINKED TO ETHYLENE DIAMINE TETRAACETIC ACID, THEIR PREPARATION AND USE TO CLEAVE DNA

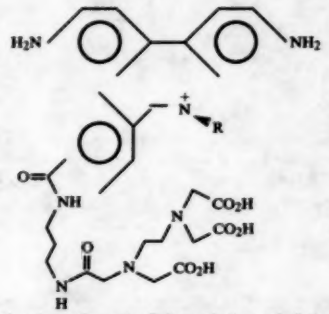
Peter B. Dervan, Pasadena, Calif., and Robert P. Hertzberg, Downingtown, Pa., assignors to California Institute of Technology, Pasadena, Calif.

Continuation-in-part of Ser. No. 860,604, May 7, 1986, Pat. No. 4,665,184, which is a continuation of Ser. No. 540,914, Oct. 12, 1983, abandoned, which is a continuation-in-part of Ser. No. 338,327, Jan. 11, 1982, abandoned. This application Jan. 23, 1987, Ser. No. 6,442

Int. Cl.[5] C07H *21/00*

U.S. Cl. 536—27 8 Claims

1. The process of cleaving double stranded DNA by contact with a compound having the formula:



wherein the above formula, R is methyl or ethyl, in the presence of effective DNA cleavage promoting amounts of ferrous ion and oxygen.

4,942,228

## PRODUCTION OF POLYOL POLYESTERS HAVING REDUCED COLOR CONTENT

Michael S. Gibson, Milford, Ohio, assignor to The Procter & Gamble Company, Cincinnati, Ohio

Filed May 6, 1986, Ser. No. 860,285

Int. Cl.[5] C07H *1/00, 13/06;* C07C *67/03, 67/60*

U.S. Cl. 536—119 11 Claims

1. A process for treatment of $C_1$–$C_3$ alkyl esters of $C_6$–$C_{22}$ fatty acids wherein at least 0.1% by weight of the fatty acid moieties contain conjugated or conjugatable sites of unsaturation, said process comprising the steps of:

(A) contacting said $C_1$–$C_3$ alkyl esters of fatty acids in a liquid state with an alkoxide base at a temperature of from about 60° C. to about 140° C. for from about 10 minutes to about 120 minutes, the said alkoxide base having the formula $(RO)_nM$, wherein R is an alkyl radical of from 1 to about 5 carbon atoms, M is an alkali metal, an alkaline earth metal or aluminum, and n is 1 when M is alkali metal, 2 when M is alkaline earth metal, and 3 when M is aluminum, and wherein the weight ratio of alkoxide base to ester is at least 0.005:1;

(B) separating undissolved solids from the liquid esters of Step A; and

(C) distilling the liquid esters from Step B and collecting the distilled esters.

6. A process for preparing polyol polyesters of improved color from polyols and $C_1$–$C_3$ alkyl esters of $C_6$–$C_{22}$ fatty acids in which at least 0.1% by weight of the fatty acid moieties in said $C_1$–$C_3$ alkyl fatty esters contain conjugated or conjugatable sites of unsaturation, the said process comprising:

I. Pretreating said $C_1$–$C_3$ alkyl fatty esters by a process comprising the steps of:

(A) contacting said $C_1$–$C_3$ alkyl fatty esters in a liquid state with an alkoxide base at a temperature of from about 60° C. to about 140° C. for from about 10 minutes to about 120 minutes, the said alkoxide base having the formula $(RO)_nM$, wherein R is an alkyl radical of from 1 to about 5 carbon atoms, M is an alkali metal, an alkaline earth metal or aluminum, and n is 1 when M is alkali metal, 2 when M is alkaline earth metal, and 3 when M is aluminum, and wherein the weight ratio of alkoxide base to ester is at least 0.005:1;

(B) separating undissolved solids from the liquid $C_1$–$C_3$ alkyl fatty esters of Step A;

(C) distilling the liquid $C_1$–$C_3$ alkyl fatty esters from Step B and collecting the distilled esters; and

II. Reacting the distilled $C_1$–$C_3$ alkyl fatty esters from I(C) with a polyol in the presence of a basic catalyst and concurrently removing from the reaction mix the $C_1$–$C_3$ alcohol formed during the reaction.

4,942,229

## PROCESS FOR THE PRODUCTION OF PENICILLANIC ACID COMPOUNDS

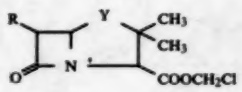
Kazumi Saeki; Masami Hirano; Kunikide Oka; Kazuto Tsukinuki, and Setsuo Oikawa, all of Nakatsu, Japan, assignors to Yoshitomi Pharmaceutical Industries, Ltd., Osaka, Japan

Filed Feb. 13, 1989, Ser. No. 310,595

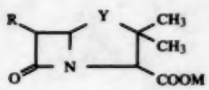
Int. Cl.[5] C07D *499/08*

U.S. Cl. 540—310 10 Claims

1. A process for the production of a penicillanic acid compound of the formula



wherein R is hydrogen, phenylacetylamino or phenoxyacetylamino and Y is sulfur or sulfonyl, which comprises reacting a compound of the formula



wherein R and Y are as defined above and M is hydrogen or an alkali metal, with bromochloromethane in the presence of a phase transfer catalyst of the formula

$$(R^1)(R^2)(R^3)(R^4)NX$$

wherein $R^1$, $R^2$, $R^3$ and $R^4$ are the same or different and each is an alkyl or aralkyl group and X is a hydroxide, chloride, bromide or hydrogensulfate ion.

4,942,230

## PROCESS FOR PREPARING SYNTHETIC VIRGINIAMYCIN $M_1$ ANALOGS

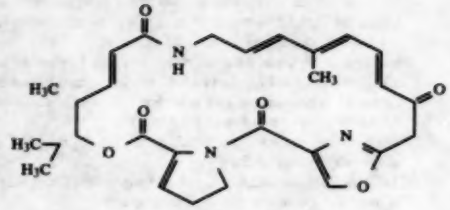
Yiu-kuen T. Lam, Plainsboro, N.J., and Raymond S. Chang, Lansdale, Pa., assignors to Merck & Co., Inc., Rahway, N.J.

Continuation of Ser. No. 208,959, Jun. 17, 1988, abandoned, Division of Ser. No. 934,232, Nov. 21, 1986, Pat. No. 4,772,595. This application Jun. 13, 1989, Ser. No. 365,324

Int. Cl.[5] C07D *498/12*

U.S. Cl. 540—456 2 Claims

1. A method of converting virginiamycin $M_1$ to a compound of the formula III:



which comprises the steps of:

(a) the addition of about 1 mole equivalent of methanesufonyl chloride to an anhydrous pyridine solution of virginiamycin $M_1$;

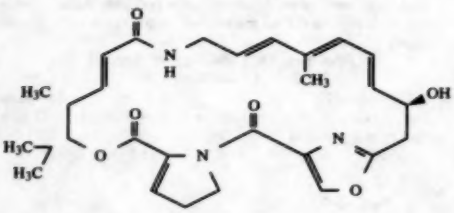
(b) incubation at about 25° C. for about 20 minutes;

(c) removal of the pyridine;

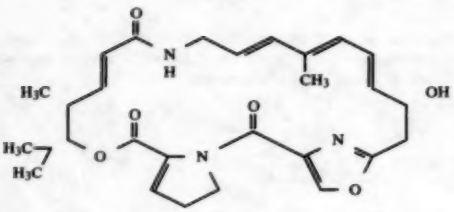
(d) partitioning; and

(e) chromatography.

2. A method of converting the compound of Formula III of claim 1 to the compounds of Formula I:



and Formula II:



which comprises the steps of:

(a) the addition of about 1 mole equivalent of sodium borohydride to a methanolic solution of the compound of Formula III of claim 1;

(b) partitioning; and

(c) chromatography.

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**4,942,231**

**METHOD OF PREPARING A CHLORINATED, BROMINATED, RADIO-BROMINATED, IODINATED AND/OR RADIOIODINATED AROMATIC OR HETEROAROMATIC COMPOUND**

**John Mertens, Brussels, Belgium, assignor to Mallinckrodt, Inc., St. Louis, Mo.**

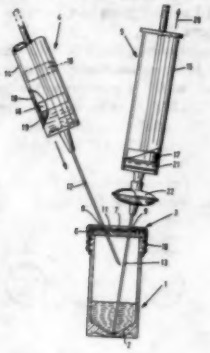
**Filed May 17, 1985, Ser. No. 735,037**

**Claims priority, application Belgium, May 24, 1984, 899739; Netherlands, Jul. 5, 1984, 8402138**

**Int. Cl.**[5] **C07D** *243/14, 33/36;* **C07B** *23/00;* **C07C** *57/58, 87/28*

**U.S. Cl. 540—586** **11 Claims**

1. In a method for preparing a chlorinated, brominated, radiobrominated, iodinated or radioiodinated aromatic or heteromatic compound, in which said compound may be optionally substituted with one or more additional substituents, by reacting the corresponding halogenated or diazonium-substituted compound in an acid medium in the presence of copper ions as a catalyst with a water-soluble chloride, bromide, radiobromide, iodide or radioiodide, the improvement comprising



conducting the reaction in the presence of a reducing agent, which is stable in acid medium, in a quantity exceeding the quantity of the catalyst.

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**4,942,232**

**IMIDAZOLYLMETHYLENE-CONTAINING TRIPHENDIOXAZINE DYES**

**Manfred Ruske, Ludwigshafen, and Manfred Patsch, Wachenheim, both of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

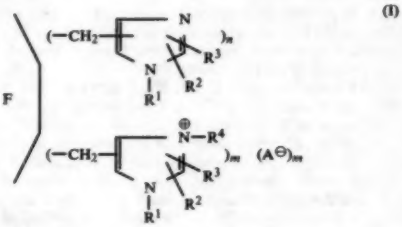
**Filed Dec. 2, 1988, Ser. No. 279,202**

**Claims priority, application Fed. Rep. of Germany, Dec. 3, 1987, 3740978**

**Int. Cl.**[5] **C07D** *413/10;* **C09B** *57/00*

**U.S. Cl. 544—76** **10 Claims**

1. An imidazolylmethylene-containing triphendioxazine dye of the formula I:



(I)

wherein

$R^1$ is hydrogen, $C_1$–$C_6$-alkyl, $C_2$–$C_5$-alkenyl or $C_2$–$C_3$-hydroxyalkyl,

$R^2$ and $R^3$ are identical or different and each is independently of the other hydrogen, $C_1$–$C_6$-alkyl or $C_2$–$C_5$-alkenyl,

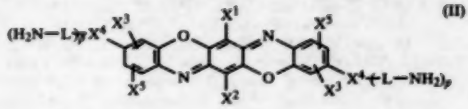
$R^4$ is hydrogen, $C_1$–$C_6$-alkyl or $C_2$–$C_3$-hydroxyalkyl,

$A^-$ is one equivalent of an anion,

m is from 0 to 4,

n is from 0 to 4, the sum of m+n being subject to the condition that $1 \leqq (m+n) \leqq 4$, and

F is the (m+n) valent radical of a triphendioxazine chromophore of the formula II:



(II)

wherein

p is 0 or 1,

$X^1$ and $X^2$ are identical or different and each is independently of the other hydrogen or chlorine,

$X^3$ is hydrogen or hydroxysulfonyl,

$X^4$ is, when p is 0, amino, substituted or unsubstituted benzoylamino, or substituted or unsubstituted phenoxy or, when p is 1, imino or $C_1$–$C_6$-alkylimino,

$X^5$ is chlorine, bromine, methyl, methoxy, sulfamoyl or $C_1$–$C_4$-monoalkyl- or -dialkyl-sulfamoyl and

L is $C_2$–$C_5$-alkylene,

with the proviso that the number of any sulfo groups present in the radical of the triphendioxazine chromophore is smaller than the number of protonatable nitrogen atoms, quaternizable nitrogen atoms or both.

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**4,942,233**

## THERMOTROPIC DI-S-TRIAZINIC DERIVATIVES

**Roberto Fornasier; Massimo Tornatore, and L. Lowrence Chapoy, all of Novara, Italy, assignors to Montedison S.p.A., Milan, Italy**

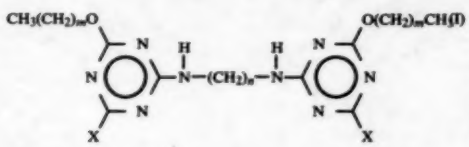
**Filed Jul. 20, 1988, Ser. No. 221,744**

**Claims priority, application Italy, Jul. 21, 1987, 21369 A/87**

**Int. Cl.[5] C07D *403/12***

**U.S. Cl. 544—212** **3 Claims**

1. A thermotropic di-s-triazinic derivative of the formula:



wherein:

m is zero or an integer of from 1 to 5,

n is an integer of from 5 to 30, and

X is a halogen or a $CH_3(CH_2)_mO$— group.

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**4,942,234**

## ISOTHIAZOLONE 1,1-DIOXIDE DERIVATIVES WITH PSYCHOTROPIC ACTIVITY

**Magid A. Abou-Gharbia, Wilmington, Del.; Guy A. Schiehser, Malvern, and Usha R. Patel, Audubon, both of Pa., assignors to American Home Products Corporation, New York, N.Y.**

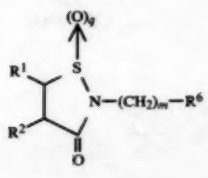
**Division of Ser. No. 22,197, Mar. 5, 1987, Pat. No. 4,833,249.**

**This application Feb. 28, 1989, Ser. No. 316,888**

**Int. Cl.[5] C07D *521/00***

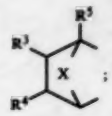
**U.S. Cl. 544—332** **4 Claims**

1. A compound having the formula



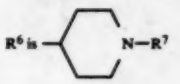
wherein

$R^1$ and $R^2$ taken together represent



where the dotted lines represent optional double bonds;

$R^3$, $R^4$ and $R^5$ are each, independently, hydrogen, lower alkyl, aryl of 6–12 carbon atoms or halo;



wherein $R^7$ is phenyl, 2-pyridinyl, 2-pyrimidinyl, 3-pyridazinyl or 2-pyrazinyl or any of the foregoing $R^7$ moieties substituted by lower alkyl, lower alkoxy, halo, cyano, trifluoromethyl or nitro;

X is lower alkylene, vinylene, O or NH;

m is 1–5;

q is 1–2;

and the pharmaceutically acceptable salts thereof.

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**4,942,235**

## PROCESS FOR CERTAIN (2R-TRANS)HEXAHYDROAROQUINOLIZINES

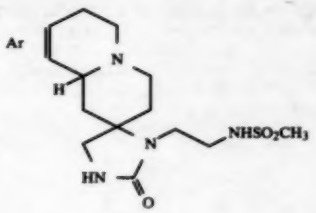
**Ann E. DeCamp, North Plainfield; Ralph P. Volante, East Windsor; Anthony O. King, Colonia, and Ichiro Shinkai, Westfield, all of N.J., assignors to Merck & Co., Inc., Rahway, N.J.**

**Filed Mar. 16, 1989, Ser. No. 324,138**

**Int. Cl.[5] C07D *455/03***

**U.S. Cl. 546—18** **4 Claims**

1. A process for facilely producing (2R-trans)-N-[2-(1,3,4,6,7,12b-hexahydro-2'-oxospiro-[2H-aro-[2,3-a]quinolizine-2,4'-imidazolidin]-3'-yl)ethyl]methanesulfonamide having the formula



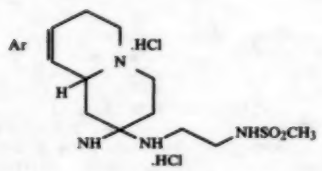
wherein

or is an aromatic ring system selected from the groups consisting of $R^1$,$R^2$-benzo[b]furo, $R^1$,$R^2$-benzothieno, $R^1$,$R^2$-thieno, $R^1$,$R^2$-furo, $R^1$,$R^2$-benzo, $R^1$,$R^2$-indolo, $R^1$,$R^2$-pyridino, thiazolo, imidazo, pyrazolo, $R^1$,$R^2$-naphtho-, and $R^1$,$R^2$ pyrrolo; wherein $R^1$ and $R^2$ are independently hydrogen, halo, hydroxy, $C_{1-3}$ alkoxy, lower alkyl, or carboxy, or together are methylenedioxy or $C_{3-4}$ alkylene; and wherein the free bonds of

are attached to the quinolozine ring in either configuration of

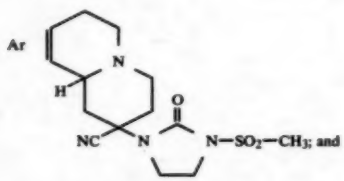
comprising:

(1) intimately contacting (2R,trans)-N-[2-[2-cyano-(1,3,4,6,7,12b-hexahydro-2H-aro-[2,3-a] quinolizin-2-yl)amino]ethyl]methanesulfonamidebishydrochloride having the formula



wherein

is as above defined, with a substantial molar excess of carbonyldiimidazole in the presence of 1,8-diazabicyclo[5.4.0]undec-7-ene or other hydrogen chloride acceptor at temperatures in the range of from about 15° to 50° C. in an inert organic solvent to obtain (trans)-1,3,4,6,7,12b-hexahydro-2-[3-(methylsulfonyl)-2-oxo-1-imidazolidinyl]-2H-aro-[2,3-a]-quinolizine-2-carbonitrile having the formula



(2) intimately contacting said (trans)-1,3,4,5,7,12b-hexahydro-2-[3-(methylsulfonyl)-2-oxo-1-imidazolidinyl]-2H-aro-[2,3-a]quinolizine-2-carbonitrile with hydrogen in the presence of Raney nickel catalyst and sodium methoxide while maintaining the temperature and pressure at about 50°±1° C. and about 40 psig to obtain (2R-trans)-N-[2-(1,3,4,6,7,12b-hexahydro-2'-oxospiro[2H-aro[2,3-a] quinolizine-2,4'-imidazolidin]-3'-yl)ethyl]-methanesulfonamide.

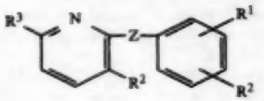
4,942,236

## 2-ARYL SUBSTITUTED PYRIDYL-CONTAINING PHENYL SULFONAMIDO COMPOUNDS AS ANTIALLERGIC AND ANTIINFLAMMATORY AGENTS

John H. Musser, Malvern; Reinhold H. W. Bender, Valley Forge, and Anthony F. Kreft, III, Trooper, all of Pa., assignors to American Home Products Corporation, New York, N.Y.

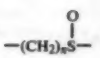
Division of Ser. No. 103,224, Sep. 30, 1987, Pat. No. 4,826,990.
This application Feb. 15, 1989, Ser. No. 311,558
Int. Cl.[5] C07D 213/76, 213/42
U.S. Cl. 546—334 2 Claims

1. A compound having the formula

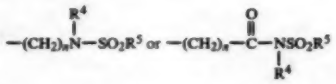


wherein

Z is $-(CH_2)_nO-$, $-(CH_2)_nS-$,



or $-(CH_2)_nSO_2-$;

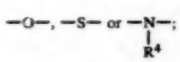


n is 0–5;

$R^2$ is, independently, hydrogen, loweralkyl, loweralkoxy, trifluoromethyl or halo;

$R^3$ is $-(CH_2)_mW-$ or ;

W represents a bond or



m is 1–15;

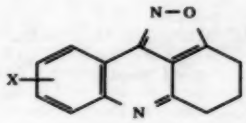
$R^4$ is hydrogen or loweralkyl;

$R^5$ is lower alkyl, monofluoroloweralkyl, difluoroloweralkyl, polyfluoroloweralkyl, perfluoroloweralkyl or

or a pharmaceutically acceptable salt thereof.

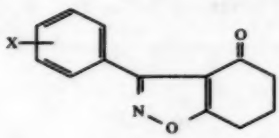
4,942,237
METHOD OF PREPARING ISOXAZOLO(5,4,3-KL)ACRIDINES
Gregory M. Shutske, Somerset, N.J., assignor to Hoechst-Roussel Pharmaceuticals Inc., Somerville, N.J.
Division of Ser. No. 364,420, Jun. 9, 1989, Pat. No. 4,920,117. This application Feb. 12, 1990, Ser. No. 494,188
Int. Cl.[5] C07D 498/06
U.S. Cl. 546—64 2 Claims

1. A method of preparing a compound of the formula,



where

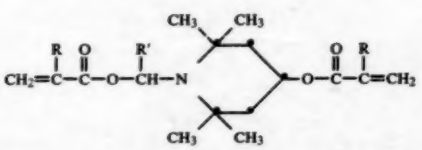
X is hydrogen, loweralkyl, loweralkoxy, halogen or trifluoromethyl, which comprises reacting a compound of formula



with hydrazoic acid in the presence of a protic acid or Lewis acid to afford said compound.

4,942,238
UNSATURATED DERIVATIVES OF 2,2,6,6-TETRAMETHYLPIPERIDINE
Gerhard Rytz, Schwarzenburg, and Mario Slongo, Tafers, both of Switzerland, assignors to Ciba-Geigy Corporation, Ardsley, N.Y.
Filed May 22, 1989, Ser. No. 355,218
Claims priority, application Switzerland, May 27, 1988, 2007/88
Int. Cl.[5] C07D 239/00
U.S. Cl. 546—242 4 Claims

1. A compound of formula I



I

wherein R is hydrogen, methyl or cyano, and R′ is hydrogen, $C_1$–$C_8$alkyl or phenyl.

4,942,239
PROCESS FOR THE PRODUCTION OF 2-HYDROXYPYRIDINE
Winfried Orth, Hassloch; Michael Hassler, Bruchsal; Hans W. Kleffner, Battenberg, and Wolfgang Weiss, Neckarhausen, all of Fed. Rep. of Germany, assignors to Rutgerswerke AG, Fed. Rep. of Germany
Filed Mar. 1, 1989, Ser. No. 317,537
Claims priority, application Fed. Rep. of Germany, Apr. 28, 1988, 3814358
Int. Cl.[5] C07D 213/64
U.S. Cl. 546—290 5 Claims

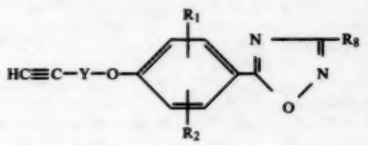
1. A process for the production of 2-hydroxypyridine comprising reacting 2-chloro-pyridine with an aqueous concentrated potassium hydroxide solution in the presence of a tertiary alcohol at reflux at atmospheric pressure.

4,942,240
PREPARATION OF AROMATIC ALDEHYDES
Norbert Bluthe, Villeurbanne, and Robert Perron, Charly, both of France, assignors to Rhone-Poulenc Chimie, Courbevoie, France
Filed Apr. 28, 1987, Ser. No. 43,363
Claims priority, application France, Apr. 28, 1986, 86 06363
Int. Cl.[5] C07C 45/49; C07D 213/02
U.S. Cl. 546—298 15 Claims

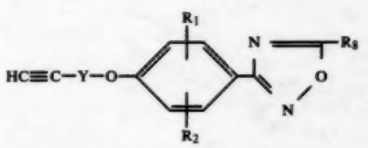
1. A process for the preparation of an aromatic aldehyde, comprising reacting hydrogen/carbon monoxide admixture with an aromatic halide in the presence of a noble metal-based catalyst and a tertiary nitrogenous base, and wherein the concentration of said tertiary nitrogenous base, expressed in moles per liter of reaction mixture, is maintained at a value of at least two moles/liter throughout the reaction period.

4,942,241
1,2,4-OXADIAZOLYL-PHENOXYALKYLISOXAZOLES AND THEIR USE AS ANTIVIRAL AGENTS
Guy D. Diana, Stephentown, and Thomas R. Bailey, Bethlehem, both of N.Y., assignors to Sterling Drug Inc., New York, N.Y.
Filed Aug. 21, 1989, Ser. No. 396,414
Int. Cl.[5] C07D 271/06
U.S. Cl. 548—131 2 Claims

1. A compound of the formula



or



wherein:

Y is an alkylene bridge of 3–9 carbon atoms;

$R_1$ and $R_2$ are hydrogen, halogen, lower-alkyl, lower-alkoxy, nitro, lower-alkoxycarbonyl or trifluoromethyl; and

$R_8$ is hydrogen or lower-alkyl of 1–5 carbon atoms.

**4,942,242**

## CERTAIN THIAZOL-4-YL-PHENOXY DERIVATIVES HAVING LIPID LOWERING PROPERTIES

**Tadao Kojima, No. 1086-2, Minamisaitama-gun, Saitama; Shunji Kageyama, No. 1-36-6, Nakano, Nakano-ku, Tokyo; Minoru Okada, No. 6-10-20, Higashioi, Shinagawa-ku, Tokyo; Isao Ohata, No. 47-17, Omiya-shi, Saitama, and Noboru Sato, No. 3-180-1, Nishimiyashita, Ageo-shi, Saitama, all of Japan**

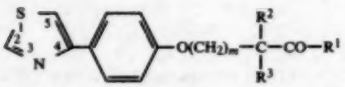
**Division of Ser. No. 203, Jan. 2, 1987, Pat. No. 4,794,113, which is a continuation-in-part of Ser. No. 623,174, Jun. 21, 1984, abandoned. This application Oct. 21, 1988, Ser. No. 261,552**

**Claims priority, application Japan, Jun. 24, 1983, 58-113988; Oct. 27, 1983, 58-201639**

**Int. Cl.[5] C07D *277/32, 277/42, 277/44, 277/54***

**U.S. Cl. 548—192** **10 Claims**

1. A phenoxy compound having the formula (I):



wherein $R^1$ is a hydroxyl group, amino or lower alkoxy group; $R^2$ and $R^3$, which may be the same or different, each is a hydrogen atom or $C_{1-3}$ alkyl group; and wherein the thiazolyl group can be unsubstituted, or substituted at the 2-position by lower alkyl group or amino group optionally substituted with lower alkyl group, phenyl group, cyclohexylcarbamoyl group or imidazolyl lower alkanoyl group; or substituted at the 5-position by lower alkyl group; and m is 0 or an integer of 1 to 6 pharmaceutically acceptable salts thereof.

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**4,942,243**

## PROCESS FOR PREPARING N''-[4-[[(2-CYANOETHYL)THIO]METHYL]-2-THIAZOLYL]GUANIDINE

**Moon G. Koh; Jai M. Shin; Dong S. Kim, and Choon S. Lee, all of Seoul, Rep. of Korea, assignors to Hanil Pharmaceutical Ind., Co., Ltd., Seoul, Rep. of Korea**

**Filed Apr. 8, 1988, Ser. No. 179,267**

**Claims priority, application Rep. of Korea, Mar. 11, 1988, 2575-88**

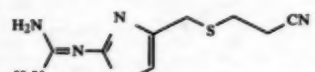
**Int. Cl.[5] C07D *277/48***

**U.S. Cl. 548—193** **6 Claims**

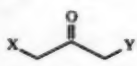
1. A process for preparing N''-[4-[[(2-cyanoethyl)thio]methyl]-2-thiazolyl]guanidine of the formula (I) in high yield which comprises the steps of:

(a) reacting a dihaloacetone of formula (II) with a β-cyanoethylthiol to produce a 1-halo-3-(2-cyanoethylthio)propanone of the formula (III) in a two phase solvent system at a pH of about 4.5–6 at a temperature of about 4° to 30° C., and

(b) reacting said 1-halo-3-(2-cyanoethylthio)propanone of formula (III) with an amidinothiourea at a temperature of about 30°–70° C. for about 3 to 10 hours so as to produced the guanidine of formula (I), wherein the formulas (I), (II), and (III) are as follows:



(I)



(II)

(III)

wherein X and Y are a halogen atom such as chlorine or bromine.

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**4,942,244**

## DIASTEREOMERIC TRIAZOLYL GLYCOL ETHERS-FUNGICIDES AND GROWTH REGULATORS

**Ernst Buschmann, Ludwigshafen; Linhard Sproesser, Bad Durkheim; Bernd Zeeh; Johann Jung, both of Limburgerhof; Wilhelm Rademacher, Limburgerhof; Eberhard Ammermann, Ludwigshafen, and Ernst-Heinrich Pommer, Limburgerhof, all of Fed. Rep. of Germany, assignors to BASF Aktiengesellschaft, Ludwigshafen, Fed. Rep. of Germany**

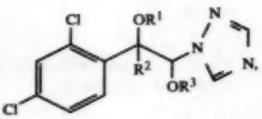
**Division of Ser. No. 829,774, Feb. 13, 1986, abandoned. This application Apr. 8, 1988, Ser. No. 180,690**

**Claims priority, application Fed. Rep. of Germany, Feb. 13, 1985, 3504897**

**Int. Cl.[5] C07D *249/08***

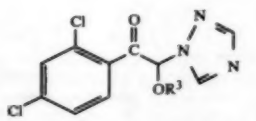
**U.S. Cl. 548—268.2** **2 Claims**

1. A process for the preparation of a diastereomer of the formula Iα



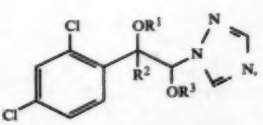
Iα

where $R^1$ is hydrogen, alkyl of 1 to 6 carbon atoms, alkenyl of 2 to 4 carbon atoms or unsubstituted or substituted benzyl, $R^2$ is methyl, ethyl or vinyl, $R^3$ is alkyl of 1 to 6 carbon atoms, cyclohexyl, methylcyclohexyl or unsubstituted or substituted benzyl, the substitutions on the $R^1$ and $R^3$ benzyl groups being 1 or 2 halogen, $C_1$–$C_4$-alkyl, trifluoromethyl or $C_2$–$C_4$-alkenyl substituents, and the asymmetric centers of the molecule have an RR or SS configuration, wherein a ketone of the formula II



II

where $R^3$ has the above meanings, is subjected to a diastereoselective Grignard reaction with a compound of the formula $R^2MgX$, where $R^2$ has the meanings given above and X is Cl, Br or I, and, if required, the resulting alcohol compound of the formula Iα



Iα

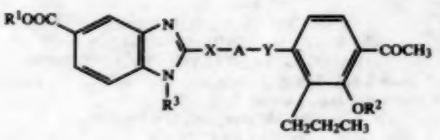
where $R^2$ and $R^3$ have the above meanings, $R^1$ is hydrogen and $C_1$ and $C_2$ have an RR or SS configuration, is converted to an ether of the formula Iα, where $R^1$ has the meanings stated above with the exception of hydrogen.

## 4,942,245
## BENZIMIDAZOLE DERIVATIVES

Kuniyoshi Masuzawa, Matsudo; Kyuya Okamura, Ohmiya; Keigo Nishino, Ohmiya; Mitsuo Ohashi, Ohmiya, and Katsuya Awano, Oyama, all of Japan, assignors to Kyorin Pharmaceutical Co., Ltd., Tokyo, Japan

Filed Apr. 11, 1988, Ser. No. 180,065
Claims priority, application Japan, Apr. 20, 1987, 62-96818
Int. Cl.[5] C07D 235/28, 235/30
U.S. Cl. 548—329 22 Claims

1. A benzimidazole derivative of the formula (I):



(I)

wherein:

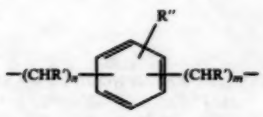
$R^1$ is a hydrogen atom, a $C_{1-6}$ alkyl group, or a dimethylaminopropyl group;

$R^2$ is a hydrogen atom, or a $C_{1-3}$ alkanol group;

$R^3$ is a hydrogen atom, a C–3 alkyl group, or a $C_{1-3}$ alkanoyl group;

X is a sulfur atom, a sulfinyl group, a sulfonyl group, an amino group, or a methylene group;

A is an unsubstituted $C_{1-12}$ alkylene group, a $C_{1-12}$ alkylene group substituted by a hydroxy group or a $C_{1-3}$ lower alkyl group, a $-(CHR')_n-CR''=CR''-(CHR')_m-$ group, or a



group, wherein R′ and R″ are each independently a hydrogen atom, a $C_{1-3}$ alkyl group or a hydroxy group, and n and m are each independently equal to 0, 1, 2 or 3; and

Y is an oxygen atom or a sulfur atom; or

an acid or alkali salt or hydrate thereof.

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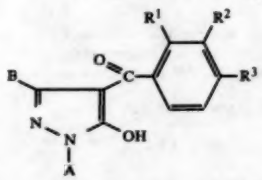
## 4,942,246
## PROCESS FOR PRODUCING 4-BENZOYL-5-HYDROXYPYRAZOLES

Norio Tanaka; Takuya Kakuta; Eiichi Oya, and Masatoshi Baba, all of Funabashi, Japan, assignors to Nissan Chemical Industries Ltd., Tokyo, Japan

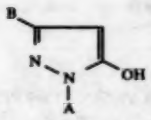
Filed Jun. 2, 1989, Ser. No. 360,468
Claims priority, application Japan, Jun. 3, 1988, 63-137095
Int. Cl.[5] C07D 231/20
U.S. Cl. 548—367 1 Claim

1. A process for producing a 4-benzoyl-5-hydroxylpyrazole of the formula III:



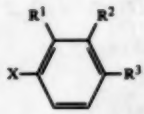
(III)

wherein A is an alkyl group having from 1 to 3 carbon atoms, an allyl group or a propargyl group, B is a hydrogen atom or a methyl group, $R^1$ is an alkyl group having from 1 to 4 carbon atoms, an alkoxy group having from 1 to 4 carbon atoms, a trifluoromethyl group, a nitro group, a cyano group or a halogen atom, $R^2$ is a hydrogen atom, an alkyl group having from 1 to 4 carbon atoms, an alkoxy group having from 1 to 4 carbon atoms, a hydroxy group, an alkoxyalkoxy group having from 3 to 6 carbon atoms, an alkoxyalkyl group having from 2 to 5 carbon atoms, an alkoxycarbonyl group having from 2 to 5 carbon atoms, a carboxyl group, a nitro group, a cyano group or a halogen atom, and $R^3$ is an alkylthio group having from 1 or 2 carbon atoms, an alkylsulfinyl group having 1 or 2 carbon atoms, an alkanesulfonyl group having 1 or 2 carbon atoms, a trifluoromethyl group, a nitro group, a cyano group or a halogen atom, which comprises reacting carbon monoxide and a 5-hydroxypyrazole of the formula II:



(II)

wherein A and B are as defined above, to a substituted benzene of the formula I:



(I)

wherein X is a bromine atom, an iodine atom or a diazonium tetrafluoroboron salt group, $R^1$ is as defined above, provided that when X is a bromine atom, $R^1$ is a fluorine atom or a chlorine atom, and when X is an iodine atom, $R^1$ is a fluorine atom, a chlorine atom or a bromine atom, $R^2$ is as defined above, provided that when X is a bromine atom, $R^2$ is a fluorine atom or a chlorine atom, and when X is an iodine atom, $R^2$ is a fluorine atom, a chlorine atom or a bromine atom, and $R^3$ is as defined above, provided that when X is a bromine atom, $R^3$ is a fluorine atom or a chlorine atom, and when X is an iodine atom, $R^3$ is a fluorine atom, a chlorine atom or a bromine atom, in the presence of a base and a catalyst of Group VIII of the Periodic Table.

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## 4,942,247
## ORGANIC NITRILES AS INSECT ANTIFEEDANTS

Richard G. Powell, Peoria, Ill.; Kenneth L. Mikolajczak, Belleair Bluff, Fla.; Bruce W. Zilkowski, Peoria, Ill.; Jon Clardy, Ithaca, N.Y., and Ellen K. Mantus, Ithaca, N.Y., assignors to The United States of America as represented by the Secretary of Agriculture, Washington, D.C. and Cornell Research Foundation, Inc., Ithaca, N.Y.

Filed Jun. 27, 1989, Ser. No. 371,879
Int. Cl.[5] C07D 209/10
U.S. Cl. 548—505 10 Claims

1. A compound of the formula:

wherein R represents alkyl and Ar represents an aromatic ring selected from the group consisting of phenyl or indolyl, in each case unsubstituted, monosubstituted, or polysubstituted by identical or different substituents selected from the group consisting of halogen, alkyl, alkoxy, and halogenated alkyl; with the provision that when R is methyl, Ar is not unsubstituted phenyl.

4,942,248

## TERTIARY-ALKYL ESTERS OF 1H-BENZOTRIAZOLE-1-CARBOXYLIC ACIDS

Paul M. Novy, Roselle, Ill., assignor to PPG Industries, Inc., Pittsburgh, Pa.

Filed Dec. 1, 1988, Ser. No. 278,691
Int. Cl.[5] C07D 249/18
U.S. Cl. 548—533 6 Claims

1. A process comprising reacting amino acid salt having at least one unblocked amino or imino group with tertiary-alkyl ester of 1H-benzotriazole-1-carboxylic acid in which the tertiary-alkyl group is tertiary-butyl or tertiary-amyl, to produce the corresponding N-(tertiary-alkoxycarbonyl)-blocked amino acid salt, wherein the six-membered ring of said ester is unsubstituted or substituted with one or two inert minor substituents and wherein the valence of each of the three nitrogen atoms in the five-membered ring of said ester is three.

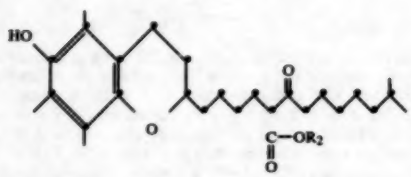
4,942,249

## PROCESS FOR PRODUCING VITAMIN E

Noal Cohen, Montclair, N.J., assignor to Hoffmann-La Roche Inc., Nutley, N.J.

Division of Ser. No. 258,354, Oct. 17, 1988, Pat. No. 4,877,890, which is a division of Ser. No. 58,309, Jun. 5, 1987, Pat. No. 4,801,724. This application Aug. 17, 1989, Ser. No. 396,500
Int. Cl.[5] C07D 311/73
U.S. Cl. 549—407 1 Claim

1. A compound of the formula:




wherein $R_2$ is lower alkyl.

4,942,250

## PROCESS FOR THE PRODUCTION OF CHLOROTHALONYL

Giuseppe Querzola, Melegnano, and Gino Epis, Lodi, both of Italy, assignors to S.I.P.C.A.M. - Societa Italiana Prodotti Chimici e per l'Agricoltura Milano S.p.A., Milan, Italy

PCT No. PCT/EP86/00218, § 371 Date Dec. 17, 1986, § 102(e) Date Dec. 17, 1986, PCT Pub. No. WO86/06066, PCT Pub. Date Oct. 23, 1986
PCT Filed Apr. 15, 1986, Ser. No. 18,948
Claims priority, application Italy, Apr. 17, 1985, 20384 A/85
Int. Cl.[5] C07C 121/56
U.S. Cl. 558—411 14 Claims

1. A process for altering the crystallographic structure of 2,4,5,6-tetrachloro-isophthalonitrile produced by chemical synthesis at a temperature above about 250° C., which comprises subjecting the 2,4,5,6-tetrachloro-isophthalonitrile having a crystallographic structure other than that of type I to a at least one of a thermal or mechanical treatment at a temperature lower than about 250° C. for a length of time sufficient to alter the crystallographic structure of said 2,4,5,6-tetrachloro-isophthalonitrile into said type I structure, said type I crystallographic structure, in decreasing order of intensity, being as follows:

| Diffraction angle (degrees) | Intensity | Interreticular distances (Å) |
|---|---|---|
| 51.2 | 100 | 3.48 |
| 56.0 | 60 | 3.19 |

-continued

| Diffraction angle (degrees) | Intensity | Interreticular distances (Å) |
|---|---|---|
| 28.8 | 35 | 6.15 |
| 62.3 | 35 | 2.87 |
| 63.6 | 35 | 2.81 |
| 40.1 | 30 | 4.42 |
| 40.7 | 30 | 4.37 |

4,942,251

## PROCESS FOR PRODUCING α-ANTHRAQUINONESULFONIC ACIDS AND RECOVERING THE CATALYST USED THEREIN

Kou Huey-Long, Taipei, Taiwan, assignor to China Technical Consultants, Inc., Taiwan

Filed Jan. 15, 1988, Ser. No. 144,505
Int. Cl.[5] C07C 143/36
U.S. Cl. 552—234 17 Claims

1. A process for producing α-anthraquinonesulfonic acids and recovering the catalyst used therein, which comprises:

(a) sulfonating anthraquinone in oleum in the presence of a metal catalyst;

(b) depositing the solubilized metal of the catalyst on a porous carrier by treating the resulting sulfonation mixture without adjusting the pH to a value greater than 7 with a reducing agent in the presence of said porous carrier;

(c) separating the metal catalyst deposited on said porous carrier from the thus treated mixture; and subsequently

(d) recovering the α-anthraquinonesulfonic acid product from the mixture.

4,942,252

## SYNTHESIS OF PHOSPHORUS AND ARSENIC, HALIDES AND HYDRIDES

Benjamin C. Hui, Peabody, Mass., and Jörg Lorberth, Weimar-Niederweimar, Fed. Rep. of Germany, assignors to CVD Incorporated, Woburn, Mass.

Filed Aug. 16, 1988, Ser. No. 232,729
Int. Cl.[5] C07F 9/72, 9/50
U.S. Cl. 556—70 19 Claims

1. A method of synthesizing a compound having the formula:

$$R_yMX_{(3-y)}$$

wherein M is selected from the group consisting of phosphorus and arsenic, R is lower alkyl, X is halogen, and y is 1 or 2, comprising the steps of:

A. providing as starting materials compounds having the formulas, $R_3M$ and $X_3M$ wherein each M is the same element and M, X, and R are defined as before;

B. reacting said starting materials to form an intermediate complex according to the following reaction:

$$2\ R_3M + 2MX_3 \rightarrow (R_3M.MX_3)_2;\ \text{and}$$

C. reacting said intermediate complex with two additional equivalents of one of said starting materials according to a selected one of the following equations:

$$2\ R_3M + (R_3M.MX_3)_2 \rightarrow 6\ R_2MX$$

$$2\ MX_3 + (R_3M.MX_3)_2 \rightarrow 6\ RMX_2$$

thereby providing the product:

$$R_yMX_{(3-y)}$$

4,942,253

## POLYHYDROXYBENZOIC ACID DERIVATIVES

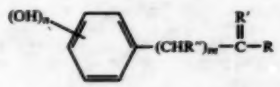
Bartholomeus van't Riet, 3419 Noble Ave., Richmond, Va. 23222; Howard L. Elford, 3343 Gloucester Rd., Richmond, Va. 23227, and Galen L. Wampler, 6938 Chamberlayne Rd., Mechanicsville, Va. 23111

Division of Ser. No. 497,370, May 23, 1983, Pat. No. 4,623,659. This application Sep. 15, 1986, Ser. No. 907,562

Int. Cl.[5] C07C *13/14, 131/00*

U.S. Cl. 558—6 1 Claim

1. A compound of the formula



wherein R'' is H or OH and wherein, when m is 1, R is NHOH and R' is NOH, n is 2–5; when m is is 0, R is O—$C_{1-3}$alkyl and R' is NH, n is 4–5; when m is O, R is NHOH and R' is NH, n is 4–5; when m is 1, R is O—$C_{1-3}$alkyl and R' is NH, n is 3–5; when m is 1, R is NHOH and R' is NH, n is 3–5; and when m is 0 or 1, R is $NH_2$ and R' is NH, n is 3–5; or a pharmaceutically-acceptable salt thereof.

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4,942,254

## METHODS FOR ACID CATALYZED REACTIONS

Donald C. Young, Fullerton, Calif., assignor to Union Oil Company of California, Brea, Calif.

Continuation of Ser. No. 771,259, Aug. 30, 1985, Pat. No. 4,722,986, which is a continuation-in-part of Ser. No. 679,235, Dec. 7, 1984, Pat. No. 4,589,925, and Ser. No. 675,774, Nov. 28, 1984, Pat. No. 4,673,152, and Ser. No. 673,358, Nov. 20, 1984, Pat. No. 4,664,171, and Ser. No. 673,508, Nov. 20, 1984, and Ser. No. 453,496, Dec. 27, 1982, which is a continuation-in-part of Ser. No. 442,296, Nov. 17, 1982, abandoned, and Ser. No. 444,667, Nov. 26, 1982, and Ser. No. 331,001, Dec. 15, 1981, Pat. No. 4,402,852, and Ser. No. 330,904, Dec. 15, 1981, Pat. No. 4,404,116, and Ser. No. 318,629, Nov. 5, 1981, Pat. No. 4,445,925, and Ser. No. 318,368, Nov. 5, 1981, Pat. No. 4,447,253, and Ser. No. 318,343, Nov. 15, 1981, Pat. No. 4,397,675. This application Jan. 29, 1988, Ser. No. 149,735

The portion of the term of this patent subsequent to May 12, 2004, has been disclaimed.

Int. Cl.[5] C07C *101/02, 149/40;* C08F *8/12, 8/34*

U.S. Cl. 558—250 9 Claims

1. A method for carrying out an acid-catalyzed reaction, selected from the group consisting of hydrolysis, alcoholysis, and combinations thereof, by reacting an organic compound having a chemical linkage selected from the group consisting of amido ester, acid ester, thioester, epoxy, and amino linkages, and combinations thereof with a reactant selected from the group consisting of water when said reaction comprises hydrolysis, alcohols when said reaction comprises alcoholysis, thiols when said reaction comprises thiolysis, and combinations thereof, which method comprises the step of conducting said reaction in the presence of a catalytically active amount of the monoadduct of sulfuric acid and a chalcogen-containing compound having the empirical formula

wherein X is a chalcogen, each of $R_1$ and $R_2$ is independently selected from the group consisting of hydrogen, $NR_3R_4$ and $NR_5$, with at least one of $R_1$ and $R_2$ being other than hydrogen, each of $R_3$ and $R_4$ is independently selected from the group consisting of hydrogen and monovalent organic radicals, and $R_5$ is a divalent organic radical, wherein the molar ration of said chalcogen-containing compound to said sulfuric acid is about ¼ to less than 2.

4,942,255

## METHOD FOR PRODUCING α-ASPARTYLPHENYLALANINE DERIVATIVES

Satoji Takahashi, and Tadashi Takemoto, both of Yokkaichi, Japan, assignors to Ajinomoto Co., Inc., Tokyo, Japan

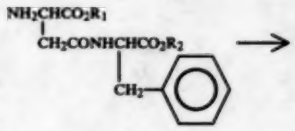
Filed Jan. 25, 1989, Ser. No. 301,445

Claims priority, application Japan, Feb. 5, 1988, 63-23842; Jun. 21, 1988, 63-152716

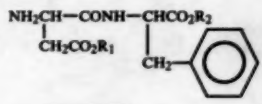
Int. Cl.[5] C07C *101/02*

U.S. Cl. 560—41 8 Claims

1. A method for converting a β-aspartylphenylalanine derivative represented by formula (1) into an α-aspartylphenylalanine derivative represented by formula (2), which comprises:



Formula (1)



Formula (2)

reacting the compound of formula (1), wherein $R_1$ and $R_2$ are independently hydrogen or alkyl groups having 1 to 4 carbon atoms, with a basic compound and with a compound which is an hydroxide, sulfate, chloride, carbonate or acetate of an element selected from the group consisting of zinc, copper, nickel, magnesium, aluminum, iron, tin, silicon and titanium; in an alcoholic solvent wherein said alcohol is present in an amount sufficient to prevent precipitation of salts.

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4,942,256

## NOVEL INTERMEDIATES IN THE MANUFACTURE OF NOVEL THROMBOXANE $A_2$ ANTAGONISTS

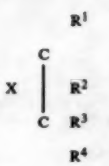
Robert B. Garland, and Masateru Miyano, both of Northbrook, Ill., assignors to National Research Development Corporation, London, United Kingdom

Filed Dec. 13, 1988, Ser. No. 283,707

Int. Cl.[5] C07C *69/74, 49/297, 49/303;* C07D *311/78*

U.S. Cl. 560—121 8 Claims

1. An optically active compound according to the general formula

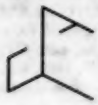


wherein

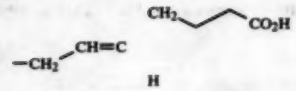
X is a bicyclic ring of the structure

or

-continued



$R^1$ is hydrogen
$R^2$ is of the formula



$R^3$ is hydrogen and
$R^4$ is

wherein $R^5$ is alkyl of from one to ten carbon atoms or

wherein $R^5$ is as defined above.

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**4,942,257**

**METHOD OF MANUFACTURING ALKALI METAL SALT OF 2,3,6,7-NAPHTHALENETETRACARBOXYLIC ACID**

**Yakudo Tachibana; Kazuhiko Tate; Toshifumi Suzuki, all of Tokyo, and Kouji Chiba, Miura, all of Japan, assignors to NKK Corporation, Tokyo, Japan**

**Filed Aug. 31, 1989, Ser. No. 401,635**
**Claims priority, application Japan, Sep. 5, 1988, 63-221637**
**Int. Cl.[5] C07C *51/02, 51/347, 51/353***
**U.S. Cl. 562—481** **24 Claims**

1. A method of manufacturing an alkali metal salt of a 2,3,6,7-naphthalenetetracarboxylic acid, comprising heating (i) a sodium salt or (ii) a mixture of sodium salt and potassium salt, of at least one naphthalenecarboxylic acid selected from the group consisting of naphthoic acids and naphthalenepolycarboxylic acids other than 2,3,6,7-naphthalenetetracarboxylic acid to an elevated temperature in an inert gas atmosphere in the presence of a Henkel reaction catalyst and sodium halide to convert said salt or mixture of salts of said at least one naphthalenecarboxylic acid into said 2,3,6,7-naphthalenetetracarboxylic acid salt or salts.

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**4,942,258**

**PROCESS FOR PREPARATION OF METHACRYLIC ACID WITH REGENERATION OF CATALYST**

**Thomas G. Smith, Naperville, Ill., assignor to Amoco Corporation, Chicago, Ill.**

**Continuation of Ser. No. 40,302, Apr. 20, 1987, abandoned, which is a continuation of Ser. No. 624,048, Jun. 25, 1984, abandoned. This application Apr. 12, 1988, Ser. No. 180,304**
**Int. Cl.[5] C07C *51/353, 57/04***
**U.S. Cl. 562—599** **2 Claims**

1. In a vapor-phase process for making methacrylic acid comprising combining in a reactor a feed containing propionic acid and formaldehyde in the presence of a solid catalyst comprising cesium cation and a silica support having a surface area of 20 to 275 $m^2/g$, a pore volume of 0.1 to 0.8 cc/g, and an average pore diameter of 75 to 200 Angstroms, the improvement comprising intermittently halting said feed to said reactor and decoking said catalyst by passing an oxygen-containing gas containing 1 to 5% by volume oxygen and 95 to 99% by volume inert gas over it at a temperature no greater than about 800° F., said decoking being performed at an initial temperature no greater than 650° F. and then by controlling the exotherm incrementally to a temperature no greater than about 800° F.

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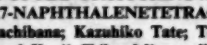
**4,942,259**

**PROCESS FOR PREPARING N-VINYL AMIDES**

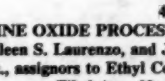
**Gene E. Parris, Revere, and John N. Armor, Orefield, both of Pa., assignors to Air Products and Chemicals, Inc., Allentown, Pa.**

**Filed Jun. 27, 1988, Ser. No. 211,806**
**Int. Cl.[5] C07C *209/78, 209/66, 209/68, 211/21***
**U.S. Cl. 564—187** **19 Claims**

1. In a process for forming N-vinyl amides having the structural formula:



wherein $R^1$ is hydrogen, a $C_1$ to $C_6$ alkyl group or a $C_6$–$C_9$ aryl or substituted aryl group, by heating to a temperature of about 210°–350° C., carboxylic acid amides having the structural formula:



wherein
$R^1$ is defined above, and
$R^2$ is a $C_1$ to $C_9$ alkoxy, carboxy or carboxamide group, the improvement for achieving higher conversions and/or selectivities for said N-vinyl amides which comprises:
heating said carboxylic acid amides in the presence of a porous catalytically active material selected from the group consisting of: activated carbon, magnesium oxide, strontium pyrophosphate, neutral or basic calcium hydroxyapatite, $CuCrO_2$ and $La_2O_3$.

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**4,942,260**

**AMINE OXIDE PROCESS WITH $CO_2$ AND ALUMINUM**

**Kathleen S. Laurenzo, and Joe D. Sauer, both of Baton Rouge, La., assignors to Ethyl Corporation, Richmond, Va.**

**Filed Aug. 29, 1988, Ser. No. 237,098**
**Int. Cl.[5] C07C *135/02***
**U.S. Cl. 564—298** **11 Claims**

1. A process for making a low nitrosamine or substantially nitrosamine-free amine oxide, said process consisting essentially of reacting a tertiary amine with aqueous hydrogen peroxide in the presence of a catalyst formed by adding carbon dioxide to the reaction mixture and in contact with aluminum metal.

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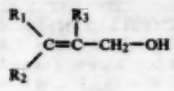
**4,942,261**

**PROCESS FOR PREPARATION OF ALLYL TYPE AMINE**

**Yoshimasa Ishimura; Takami Oe; Yuseki Suyama, and Nobuyuki Nagato, all of Kawasaki, Japan, assignors to Showa Denko Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 9, 1988, Ser. No. 282,095**
**Claims priority, application Japan, Dec. 11, 1987, 62-312339; Dec. 23, 1987, 62-323833**
**Int. Cl.[5] C07C *209/16***
**U.S. Cl. 564—480** **11 Claims**

1. A process for the preparation of an allyl amine, which comprises reacting an allyl alcohol represented by the following formula (I):



(I)

wherein $R_1$, $R_2$ and $R_3$ independently represent a hydrogen atom or an aliphatic hydrocarbon group having 1 to 8 carbon atoms

with at least one member selected from the group consisting of ammonia, a primary amine and a secondary amine in the presence of a palladium compound and a multidentate phosphorus compound.

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**4,942,262**

## PROCESS FOR PRODUCING VITAMIN A OR ITS CARBOXYLIC ACID ESTERS

**Toshiki Mori; Shigeaki Suzuki, and Takashi Oaishi, all of Kurashiki, Japan, assignors to Kuraray Company Ltd., Kurashiki, Japan**

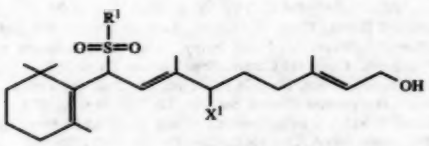
**Filed Jun. 20, 1989, Ser. No. 368,800**

**Claims priority, application Japan, Jul. 5, 1988, 63-168190; Jul. 5, 1988, 63-168191**

**Int. Cl.[5] C07C *147/00***

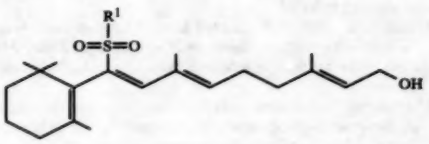
**U.S. Cl. 568—32** **12 Claims**

1. A process for producing vitamin A or its carboxylic acid ester, which comprises (i) treating a halogenated sulfone of the general formula (1)



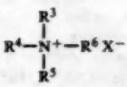
(1)

wherein $R^1$ represents a phenyl group which may be substituted by lower alkyl, halogen or lower alkoxy, and $X^1$ represents a halogen atom, and/or a vinyl sulfone of the general formula (2)



(2)

wherein $R^1$ has the same meaning as defined above, with potassium hydroxide in a hydrocarbon solvent in the presence of a quaternary ammonium salt of the general formula (3) or a crown ether



(3)

wherein $R^3$, $R^4$, $R^5$ and $R^6$ are the same or different and represents an alkyl group of 1–20 carbon atoms or an aralkyl group of 7–9 carbon atoms, and X represents a halogen atom, a lower alkoxy group, a lower alkylcarbonyloxy or a benzoyloxy group, a hydrogensulfate or a hydroxyl group, and, if necessary, acylating the resultant vitamin A.

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**4,942,263**

## PREPARATION OF ALDEHYDES

**John R. Monnier, Fairport, and Peter J. Muehlbauer, Spencerport, both of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 13, 1989, Ser. No. 337,233**

**Int. Cl.[5] C07C *45/34***

**U.S. Cl. 568—476** **10 Claims**

1. Process for the preparation of crotonaldehyde, said process comprising reacting 1,3-butadiene with oxygen in the presence of a catalytic quantity of a catalyst consisting essentially of metallic silver on a support, said support selected from the class consisting of alumina, silica-alumina, and silica, said support having a surface area of at least about 50 $m^2/g$; said process being conducted at a temperature of from about 150° C. to about 325° C., and at a pressure of from about 0.1 to about 100 atmospheres.

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**4,942,264**

## PROCESS FOR THE PREPARATION OF INSECTICIDALLY ACTIVE DIPHENYLETHER COMPOUNDS

**Michael J. Bushell, Wokingham, and Ralph A. Raphael, Barton, both of England, assignors to Imperial Chemical Industries PLC, London, Great Britain**

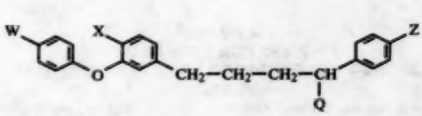
**Filed Feb. 12, 1988, Ser. No. 158,232**

**Claims priority, application United Kingdom, Feb. 17, 1987, 8703653**

**Int. Cl.[5] C07C *43/263; A61K 31/085***

**U.S. Cl. 568—635** **1 Claim**

1. A process for the preparation of a compound of formula (I):



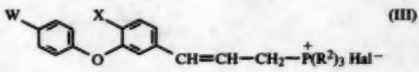
(I)

wherein W is hydrogen or halogen, X is hydrogen or fluoro, Q is a group of formula:

$$-(CF_2)_nR^1$$

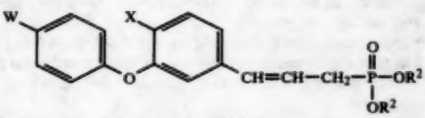
wherein $R^1$ is hydrogen, fluoro or chloro and n has a value of one, and Z is halo, alkyl of up to six carbon atoms, alkoxy of up to six carbon atoms, haloalkyl of up to six carbon atoms or haloalkoxy of up to six carbon atoms, which comprises the step of:

(i) Wittig reaction between either (a) a phosphonium salt of formula (III):



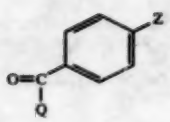
(III)

or (b) a phosphonate of formula (IV):



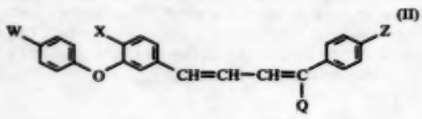
(IV)

wherein W and X have any of the meanings given hereinbefore, $R^2$ represents alkyl of up to six carbon atoms or aryl, and $Hal^-$ represents a halide anion, and a ketone of formula (VII):



(VII)

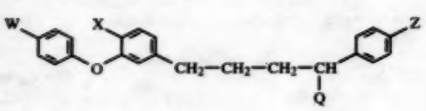
wherein Q and Z have any of the meanings given hereinbefore, in the presence of a strong base, to produce a diene of formula (II):



(II)

followed by the step of:

(ii) reaction of the diene of formula (II) with hydrogen as a reducing agent in the presence of a catalyst, and at a pressure of from 1.5 to 20 atmospheres to produce the corresponding compound of formula (I):



(I)

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**4,942,265**

## PROCESS FOR PREPARING 2,2-BIS(4-HYDROXYPHENYL)PROPANE OF HIGH PURITY

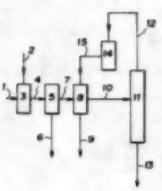
**Shigeru Iimuro; Takashi Kitamura, both of Nagoya, and Yoshio Morimoto, Tokai, all of Japan, assignors to Mitsui Toatsu Chemicals, Inc., Tokyo, Japan**

**Filed Nov. 28, 1988, Ser. No. 276,809**

**Claims priority, application Japan, Dec. 4, 1987, 62-305941**

**Int. Cl.[5] C07C *37/70, 39/16***

**U.S. Cl. 568—724** **5 Claims**



**1.** A process for preparing 2,2-bis(4-hydroxyphenyl)propane of high purity comprising:

(a) washing an adduct of 2,2-bis(4-hydroxyphenyl)propane and phenol with phenol;

(b) decomposing the washed adduct into 2,2-bis(4-hydroxyphenyl)propane and phenol by a method selected from the group consisting of distillation, extraction and steam stripping; and

(c) separating the 2,2-bis(4-hydroxyphenyl)propane and phenol resulting from said decomposition of said washed adduct, wherein 2,2-bis(4-hydroxyphenyl)propane of high purity is recovered and the phenol is used to wash said adduct in step (a).

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**4,942,266**

## PROCESS FOR PRODUCING FATTY ALCOHOLS AND $C_3$ DIOLS BY CATALYTIC HYDROGENATION

**Theo Fleckenstein, Hilden; Gerd Goebel, Erkrath; Franz-Josef Carduck, Haan; Norbert Bremus, Langenfeld, and Reinhard Eicher, Duesseldorf, all of Fed. Rep. of Germany, assignors to Henkel Kommanditgesellschaft auf Aktien, Duesseldorf-Holthausen, Fed. Rep. of Germany**

**Filed Mar. 17, 1989, Ser. No. 326,185**

**Claims priority, application Fed. Rep. of Germany, Mar. 19, 1988, 3809270**

**Int. Cl.[5] C07C *29/136, 31/20, 31/125***

**U.S. Cl. 568—864** **11 Claims**

**1.** A process for producing fatty alcohols and $C_3$ diols by the catalytic hydrogenation of fatty triglycerides comprising the steps of:

(1) providing a feed stream comprising gaseous hydrogen and liquid fatty acid triglyceride;

(2) passing said feed stream through a tube bundle reactor having a hydrogenation catalyst therein at a volume load rate of about 0.2 to about 2.5 liters of said feed stream per liter of reactor volume per hour and at a area load rate of about 1.5 to about 24 $m^3$ feed stream per $m^2$ of reactor cross-section per hour to produce at least an 80% yield of 1,2-propanediol and at least a 99% yield of fatty alcohols and less than a 0.5% yield of paraffin.

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**4,942,267**

## PERCHLOROETHYLENE STABILIZATION

**Roger W. Roark; Glenn R. Cairns, both of Painesville, and Edward A. Rowe, Jr., North Perry, all of Ohio, assignors to Occidental Chemical Corporation, Niagara Falls, N.Y.**

**Continuation of Ser. No. 945,167, Dec. 22, 1986, abandoned, which is a continuation of Ser. No. 529,987, Sep. 9, 1983, abandoned, which is a continuation of Ser. No. 320,614, Nov. 12, 1981, abandoned. This application Jul. 28, 1988, Ser. No. 225,580**

**Int. Cl.[5] C07C *17/42, 21/12***

**U.S. Cl. 570—109** **8 Claims**

**1.** A stabilized perchloroethylene composition comprising perchloroethylene and a stabilizing amount of a mixture entirely free of any compound that contains an oxirane ring and consisting essentially of

(a) an amine component selected from the group consisting of N,N'-dimethylpiperazine, N,N'-diethylpiperazine, N-methylpiperazine, N-ethylpiperazine, and mixtures thereof;

(b) an alcohol component selected from the group consisting of n-butanol, n-pentanol, cyclohexanol, 2-methoxyethanol, 2,3-butanediol, and mixtures thereof; and

(c) an olefin component selected from the group consisting of 1-octene, 1-decene, 1,3,5-cycloheptatriene, dicyclopentadiene, and mixtures thereof.

**4.** A process for the stabilization of perchloroethylene, which comprises forming a stabilized perchloroethylene composition entirely free of any compound that contains an oxirane ring by adding to perchloroethylene an effectively stabilizing amount of a mixture comprising

(a) an amine component selected from the group consisting of N,N'-dimethylpiperazine, N,N'-diethylpiperazine, N-methylpiperazine, N-ethylpiperazine, and mixtures thereof;

(b) an alcohol component selected from the group consisting of n-butanol, n-pentanol, cyclohexanol, 2-methoxyethanol, 2,3-butanediol, and mixtures thereof; and

(c) an olefin component selected from the group consisting of 1-octene, 1-decene, 1,3,5-cycloheptatriene, dicyclopentadiene, and mixtures thereof.

4,942,268

## PROCESS FOR PRODUCING A HALOBENZENE

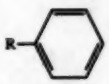
Toshihiro Suzuki, and Chizu Komatsu, both of Shizuoka, Japan, assignors to Ihara Chemical Industry Co., Ltd., Tokyo, Japan

Continuation of Ser. No. 57,650, Jun. 9, 1987, Pat. No. 4,831,199. This application Mar. 15, 1989, Ser. No. 323,845
Claims priority, application Japan, Mar. 7, 1984, 59-41929; Mar. 19, 1984, 59-52953; May 25, 1984, 59-106103
The portion of the term of this patent subsequent to May 23, 2006, has been disclaimed.
Int. Cl.[5] C07C 17/12
U.S. Cl. 570—206 13 Claims

1. A process for producing a halobenzene of the formula:

(I)

wherein R is a lower alkyl group, a lower alkoxy group, or a halogen atom selected from the group consisting of a fluorine atom, a chlorine atom and a bromine atom, and X is a halogen atom selected from the group consisting of a fluorine atom, a chlorine atom, and a bromine atom, said process comprising halogenating, with a halogenating agent which is selected from the group consisting of chlorine, bromine and sulfuryl chloride, at a temperature and pressure suitable for halogenating, a benzene compound of the formula:



(II)

in a liquid phase in the presence of a catalyst, wherein said catalyst is a combination of a component selected from the group consisting of acidic, propionic acid, isovoleric acid, monochloroacidic acid, monobromoacidic acid, dichloroacidic acid, trichloroacidic acid, α-chloropropionic acid, β-chloropropionic acid, difluoroacidic acid, trifluoroacidic acid, pentafluoropropionic acid, β-chlorotetrafluoropropionic acid, sodium, potassium and barrium salts thereof, and a zeolite having a $SiO_2/Al_2O_3$ molar ratio of from 3 to 8 and a pore size of from 6 to Å.

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4,942,269

## PROCESS FOR FRACTIONATING FAST-PYROLYSIS OILS, AND PRODUCTS DERIVED THEREFROM

Helena L. Chum, Arvada, and Stuart K. Black, Denver, both of Colo., assignors to Midwest Research Institute, Kansas City, Mo.

Filed Mar. 17, 1988, Ser. No. 169,506
Int. Cl.[5] C07C 37/20
U.S. Cl. 585—240 31 Claims

1. A process for fractionating fast-pyrolysis oils from biomass materials to produce phenolic compounds/neutral fractions extract, wherein the neutral fractions have molecular weights of 100 to 800; said extract being substitutable for a part of the phenol in phenol-formaldehyde resins, said process comprising:

admixing said oils with an organic solvent having a solubility parameter of approximately 8.4–9.1 polar components in the 1.8–3.0 range and hydrogen bonding components in the 2–4.8 range;

separating the organic solvent-soluble fraction containing the phenolic compounds/neutral fractions from said mixture and admixing it with water to extract water-soluble materials therefrom;

separating the organic solvent-soluble fraction from said water fraction and admixing said solvent fraction with an aqueous alkali metal bicarbonate solution to extract strong organic acids and highly polar compounds from said solvent fractions; and

separating the residual organic solvent-soluble fraction and removing the organic solvent therefrom to produce said phenolic compounds/neutral fractions extract.

4,942,270

## CABLE SEALING APPARATUS COMPRISING HEAT RESISTANT GEL COMPOSITIONS

Jose P. Gamarra, Union City, Calif., assignor to Raychem Corporation, Menlo Park, Calif.

Continuation-in-part of Ser. No. 72,309, Jul. 13, 1987, abandoned. This application Jul. 12, 1988, Ser. No. 217,798

Int. Cl.[5] H02G *15/08*

U.S. Cl. 174—93 33 Claims

1. A cable sealing apparatus, comprising: a first end seal, the first end seal comprising a layer of gel which comprises:

(1) about 2 to about 30 parts by weight of a poly(styrene-ethylene-butylene-styrene) triblock copolymer having a styrene to ethylene butylene block ratio of about 27 to 35 styrene blocks to about 65 to 73 ethylene butylene blocks, and having a molecular weight of at least 100,000; and

(2) about 70 to about 98 parts by weight of a plasticizer;

wherein the triblock copolymer and the plasticizer have been

(a) melt-blended and

(b) have been treated

(i) at sufficiently high temperature or

(ii) under sufficiently high shear

to cause the composition to have a cone penetration of at least about 50 ($10^{-1}$ mm), an ultimate elongation of at least about 200% and a viscosity at 200° C. of at least 10 poise;

the layer of gel including

(A) means formed therein for passage of the cable to be sealed therethrough between inner and outer opposite faces of the gel, the cable to be sealed being held in contact with the gel formed means;

(B) a convoluted member forming an outer circumferential surface of the gel, the convoluted member having a series of ridges and valleys extending circumferentially thereabout;

(C) a first member disposed adjacent to and in contact with an outer face of the gel and having means formed therein to facilitate passage of the cable to be sealed therethrough;

(D) a second member disposed adjacent to and in contact with an inner face of the gel and having means formed therein to facilitate passage of the cable to be sealed therethrough; and

(E) gel formed means comprising a plurality of longitudinal slits extending through the gel, a width of at least one of the slits being greater than a diameter of the cable to be sealed.

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4,942,271

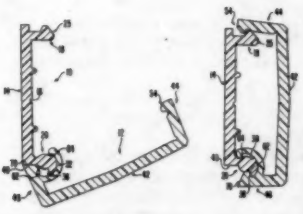
## HINGED PLASTIC DUCT FOR CONDUIT

Paul J. Corsi, Terryville; Lawrence W. Engdahl, Guilford, both of Conn., and Daniel E. Klas, North Kingstown, R.I., assignors to Hubbell Incorporated, Orange, Conn.

Filed Dec. 7, 1988, Ser. No. 280,960

Int. Cl.[5] H02G *3/04;* E05D *7/10*

U.S. Cl. 174—101 19 Claims



1. A duct assembly for enclosing conduits therein, the combination comprising:

a base having a generally U-shaped cross section along its longitudinal axis, including a generally planar central portion having first and second legs extending substantially perpendicular thereto;

a cover having a generally U-shaped cross section along its longitudinal axis, including an intermediate portion having third and fourth legs extending substantially perpendicular thereto;

means, coupled to said first and third legs, for releasably coupling said first and third legs together; and

means, coupled to said second and fourth legs, for pivotally coupling said second and fourth legs together through a maximum angular movement of about 60°

said means for pivotally coupling including means for releasably coupling said second and fourth legs, which are coupled and released via application of forces in directions substantially perpendicular to the longitudinal axes of said base and said cover, said means for releasably coupling said second and fourth legs comprising an elongated rib having a maximum transverse thickness, and an elongated groove having an elongated opening at least partially defined by a resilient arm, said maximum transverse thickness of said rib being greater than the height of said elongated opening for providing a snap fit between said rib and said groove,

said means for pivotally coupling further comprising

said elongated rib having at least two curvilinear surfaces with a radially extending planar surface therebetween,

said elongated groove having a pair of complementary curvilinear surfaces with a complementary radially extending planar surface extending therebetween, and

said two curvilinear surfaces and said two complementary curvilinear surfaces coacting to allow pivotal movement between said base and said cover, and said planar surface being engageable with said complementary planar surface to limit the relative inward pivotal movement of said cover relative to said base.

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4,942,272

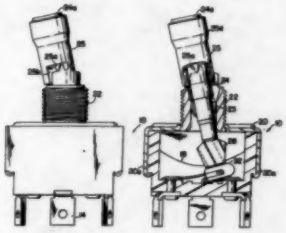
## TOGGLE SWITCH WITH SELF-LOCKING FEATURE

Richard W. Sorenson, Avon, Conn., assignor to Carlingswitch, Inc., Plainville, Conn.

Filed Apr. 13, 1989, Ser. No. 337,305

Int. Cl.[5] H01H *3/20*

U.S. Cl. 200—43.16 4 Claims



1. An illuminated toggle switch comprising a base defining a cavity, fixed and moveable contacts in the cavity, a cover for the cavity including a central bushing, said bushing defining a toggle opening, a transparent generally cylindrically shaped toggle pivotally supported in said toggle opening, said toggle having an inner end portion in said cavity for moving said moveable contact in response to said pivotable toggle movement, said toggle having an outer portion protruding outwardly of said bushing, said bushing having an outer end defining abutment surfaces, a sleeve slideably received on said toggle outer portion and said sleeve having an outer end that is open, said toggle outer portion including an outer end portion defining an enlarged flange projecting beyond said sleeve outer

open end, a spring acting between said toggle outer end flange portion and said sleeve to bias the sleeve toward said bushing, said sleeve having inwardly facing end surfaces engageable with said abutment surfaces of said bushing outer end to prevent movement of said toggle when said sleeve end surfaces and said bushing abutment surfaces are held in engagement by said spring, said bushing outer end abutment surfaces provided on both sides of said moveable toggle, and said inwardly facing surfaces on said sleeve having portions engageable with said bushing outer end abutment surfaces, said abutment surfaces defining at least two distinct sleeve positions, said bushing having parallel flat surfaces facing one another adjacent said abutment surfaces and said sleeve having complementary flat surfaces adjacent said sleeve flat surfaces to prevent rotation of said sleeve on said toggle, said sleeve being fabricated from an opaque material, and a lamp in said base cavity for internally illumining said generally cylindrical toggle so that the flanged outer end portion projecting above the sleeve is visible from the internal illumination of said lamp.

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**4,942,273**

## MULTIPLE CIRCUIT SWITCH WITH ROCKABLE ACTIVATOR AND LINEARLY MOVABLE CONTACT HOLDER

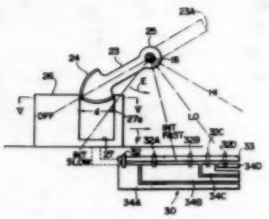
**Kenshi Furuhashi; Hiroyasu Ito, and Nobuyuki Enari, all of Niwa, Japan, assignors to Kabushiki Kaisha Tokai-Rika-Denki Seisakusho, Japan**

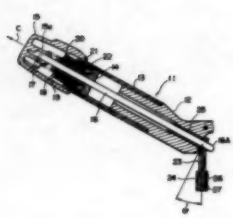
**Filed Apr. 12, 1989, Ser. No. 337,154**

**Claims priority, application Japan, Apr. 14, 1988, 63-50293[U]**

**Int. Cl.[5] H01H *19/00***

**U.S. Cl. 200—61.54** **12 Claims**





1. A switch apparatus which is switched by rotation of an operation knob, comprising:

an arm having two ends which is supported at one end thereof and which is rotated about said one end by said operation knob;

(b) a contact holder having a groove and movable electrical contact point and which is supported so as to be linearly moved by being subjected to a force produced by the rotation of said arm;

(c) a plurality of fixed electrical contact points which are connected to and disconnected from said movable electrical contact point by the linear movement of said contact holder; and

(d) an engagement portion provided at a contact portion of said arm and said contact holder and which has an outer shape which allows a position of said contact portion to be gradually changed by said rotation of said arm, whereby said contact holder can be uniformly moved in a linear direction by said rotational force substantially in proportion to the angle of rotation of said arm.

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**4,942,274**

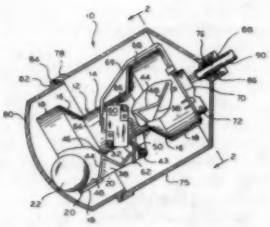
## BALL CONTROLLED FLOAT CONTROL UNIT

**Richard Riback, Deerfield, and Eric Will, Chicago, both of Ill., assignors to Expert Corporation, Chicago, Ill.**

**Filed Jun. 21, 1988, Ser. No. 209,558**

**Int. Cl.[5] H01H *35/18***

**U.S. Cl. 200—84 C** **13 Claims**



1. A pivotable float control unit including therewithin a raceway housing pivotable with said float control unit and having a ball with a predetermined diameter movable along a raceway defined by said raceway housing, said ball being complimentarily accepted by said raceway, a ball cage pivotable with respect to said raceway housing and having a plurality of segments, at least one surface of said ball cage exposed within said raceway at any given angular orientation of said pivotable raceway housing, said ball being in contact with said at least one surface of said ball cage during all angular attitudes of said pivoted raceway housing and prevented by said housing and said cage from ever being able to be disposed in contact with a second surface facing oppositely to said one surface of said ball cage said raceway housing having a generally hourglass configuration in longitudinal cross-section, said housing including in co-axial arrangement: a reduced central portion, a pair of outwardly flaring frusto-conical portions individually extending co-axially outwardly from opposite ends of said central portion, and a pair of substantially tubular extensions terminating extending co-axially outwardly from oppositely extending frusto-conical portions and terminating the opposite ends of said housing.

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**4,942,275**

## CONTROL PANEL FACE

**Timothy E. Addy, Montgomery, Ala., and Warner E. Speakman, Brighton, Tenn., assignors to ESI Companies, Inc., Memphis, Tenn.**

**Filed May 12, 1988, Ser. No. 193,401**

**Int. Cl.[5] H01H *9/00***

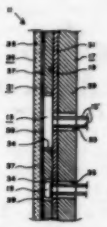
**U.S. Cl. 200—308** **8 Claims**

1. A control panel face for supporting at least one control member, said control panel face comprising:

(a) a base having a face surface for receiving at least a portion of said at least one control member, at least a portion of said face surface being made out of magnetic material;

(b) a flexible magnetic sheet for being removably attached to said face surface of said base over said at least one control member; said magnetic sheet having at least one aperture

therethrough for allowing said at least one control member to be controlled therethrough; and



(c) a flexible cover sheet for being attached to said magnetic sheet, said cover sheet including indicia for identifying said at least one control member.

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**4,942,276**

## CLICKED KEY BOARD SWITCH

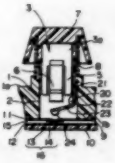
**Hideo Kato, Mobara, Japan, assignor to Futaba Denshi Kogyo Kabushiki Kaisha, Mobara, Japan**

**Filed Apr. 11, 1989, Ser. No. 336,057**

**Claims priority, application Japan, Apr. 11, 1988, 63-47774[U]**

**Int. Cl.[5] H01H *1/10***

**U.S. Cl. 200—517** **7 Claims**



1. A key board switch comprising:
a substrate;
a membrane switch arranged on said substrate;
a frame having a vertically extending aperture, said frame being arranged on said substrate interposing said membrane switch therebetween;
a key stem arranged in said aperture of said frame so as to be vertically movable within said aperture between an upper and lower position; and
a pressing member of said membrane switch provided on said frame, said pressing member being substantially L-shape and extending downwardly from within an upper portion of said aperture in a cantilever fashion, said pressing member having a distal end positioned above said membrane switch and being provided with a projection to be engaged with said key stem when said key stem is pushed down to said lower position to make said membrane switch contact, said key stem being disengaged from said projection when said key is in said upper position.

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**4,942,277**

## MICROWAVE POPCORN SERVICE BOWL

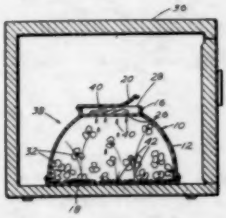
**Gary A. Narberes, 976 Jonell La., Chico, Calif. 95926**

**Filed Dec. 15, 1989, Ser. No. 451,445**

**Int. Cl.[5] H05B *6/80*; A23L *1/18***

**U.S. Cl. 219—10.55 E** **6 Claims**

1. A popcorn service bowl fabricated of materials pentrable by microwaves in an arrangement provinding said bowl with an opened top end covered by a snap-on removable cover and a bottom end terminating in a compartment, said compartment being accessible from said bowl through multiple apertures in the bottom of said bowl, said compartment having an opening opposite said bowl apertured bottom with said opening covered by a removable snap-on cover, said arrangement adapting said popcorn service bowl to be inverted and used for popping said popcorn in a microwave oven with said compartment removable snap-on cover opend providing a cooking pressure releasing means and said arrangement further adapting said



bowl for serving said popcorn popped with said bowl upright and said top end snap-on removable cover removed, said compartment being a receptacle for containment and disposal of unpopped and partly popped kernels of said popcorn and with bowl inverted, said compartment being useful for loading uncooked popcorn into said bowl and for melting and distributing a buttering substance over said popped popcorn through said bowl bottom apertures.

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**4,942,278**

## MICROWAVING OF NORMALLY OPAQUE AND SEMI-OPAQUE SUBSTANCES

**Haskell Sheinberg, Los Alamos, N. Mex.; Thomas T. Meek, Knoxville, Tenn., and Rodger D. Blake, Santa Fe, N. Mex., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Division of Ser. No. 281,158, Dec. 5, 1988, Pat. No. 4,857,266.**

**This application Jul. 24, 1989, Ser. No. 384,194**

**Int. Cl.[5] H05B *6/64***

**U.S. Cl. 219—10.55 M** **1 Claim**

1. A method of heating a substance using microwave radiation, where the substance to be heated is not normally capable of being heated by microwave radiation, said method comprising:
a. providing the substance to be heated in the form of small particles;
b. conditioning the surfaces of at least a portion of said small particles by coating each particle surface with a material which is transparent to microwave radiation, thereby facilitating microwave coupling to the substance to be heated and enhancing the effective half power depth of penetration of microwave radiation into the substance to be heated; and
c. exposing said substance to microwave radiation.

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**4,942,279**

## RF INDUCTION HEATING APPARATUS FOR FLOATING-ZONE MELTING

**Yasuhiro Ikeda, Annaka, Japan, assignor to Shin-Etsu Handotai Co., Ltd., Tokyo, Japan**

**Continuation of Ser. No. 186,290, Apr. 26, 1988, abandoned.**

**This application Dec. 20, 1989, Ser. No. 456,203**

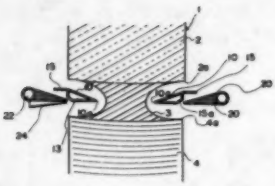
**Claims priority, application Japan, May 25, 1987, 62-125801; May 25, 1987, 62-125802; May 25, 1987, 62-125803**

**Int. Cl.[5] H05B *6/40***

**U.S. Cl. 219—10.75** **8 Claims**

1. An RF induction heating apparatus arrangement for floating-zone melting a rod-like raw material semiconductor mov-

ing relative to said apparatus, said arrangement comprising a rod-like semiconductor, a first single-turn induction heating coil disposed around said rod-like semiconductor for floating-zone melting said rod-like raw material semiconductor, whereby a floating molten zone is established within said first heating coil in said rod-like semiconductor, said floating molten zone having a crystal growth interface at the bottom thereof, a second heating coil arranged below said first heating coil, and RF power source means connected to said first and second heating coils, wherein the inner periphery of said second heating coil is positioned adjacent the periphery of said crystal growth interface formed at the bottom of the floating zone in said rod-like semiconductor.



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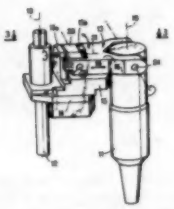
**4,942,280**

## DEVICE FOR WELDING THE END OF A TUBULAR PIECE FASTENED INSIDE A BORE OPENING ONTO A FACE OF A PLATE, SUCH AS A TUBE PLATE OF A STEAM GENERATOR

**Jean P. Gaudin, Chasseu, and Jean P. Peyrot, Chilly-Mazarin, both of France, assignors to Framatome, Courbevoie, France**

**Filed Nov. 14, 1988, Ser. No. 270,722**
**Claims priority, application France, Nov. 13, 1987, 87 15731**
**Int. Cl.[5] B23K 9/12**
**U.S. Cl. 219—60.2** **5 Claims**



1. In a device for welding a circular end part of a tubular piece fastened inside a bore opening onto a face of a plate, such as a steam-generator tube plate having a set of tube passage holes arranged according to a regular network, said device comprising:

a fastening means having a cylindrical part adapted to be introduced in a tube of the network and a jack for actuating said cylindrical part, and

a welding head comprising a centering bush adapted to be introduced into a tubular piece to be welded, and a welding electrode mounted rotatably about an axis of said centering bush,

the improvement consisting of an adjustable connecting assembly between said fastening means and said welding head, allowing translational movements of said welding head relative to said fastening means in the direction of a perpendicular common to an axis of said cylindrical part of said fastening means and to an axis of said centering bush and relative rotational movements about two perpendicular axles, one of which is parallel to the direction of said translational movement, wherein said connecting assembly comprises

(a) a first support fixed to said fastening means and comprising guide means defining a sliding plane and a sliding direction oriented along said perpendicular common to said axis of said cylindrical part of said fastening means and to said axis of said centering bush of said welding head;

(b) a slide block mounted for movement in said sliding direction on said guide means;

(c) a second support carrying said welding head mounted on said slide block and movable in rotation relative to said slide block about a first axle parallel to said sliding direction and about a second axle parallel to said sliding plane and perpendicular to said first axle; and

(d) means for returning said slide block in relation to said slide block.

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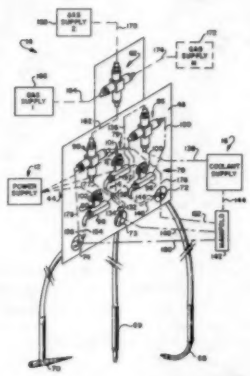
**4,942,281**

## MULTI-TORCH INTERFACE ASSEMBLY FOR INERT GAS WELDING

**Craig F. Srba, 6837 Walnut St., Westerville, Ohio 43081**

**Filed Aug. 3, 1989, Ser. No. 389,163**
**Int. Cl.[5] B23K 9/16**
**U.S. Cl. 219—75** **20 Claims**



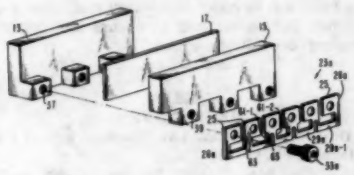
1. In an inert gas welding system wherein welding torches of varying configuration are removably connectable by an elongate cable with a controlled current source located within a cabinet, and are connectable by elongate inert gas and coolant conduits respectively with a source of inert gas and a source of coolant, the improved multi-torch interface assembly, comprising:

current coupling means coupled in current directing relationship with said controlled current source and with at least two said elongate cables for selection to apply said current source to a select one said elongate cable;

an inert gas valve having an input in gas transfer relationship with said inert gas source and connected with at least two said elongate conduits and actuable to connect said inert gas source with a select one of said elongate inert gas conduits; and

a coolant valve in fluid transfer relationship with said coolant source and connected in coolant transfer relationship with at least two said elongate conduits and actuable to connect said coolant source with a select one of said elongate coolant conduits.

4,942,282
**SPLIT HEATER BAR**
Wayne P. Jensen, San Marcos, Calif., assignor to Hughes Aircraft Company, Los Angeles, Calif.
Filed Jun. 16, 1989, Ser. No. 367,164
Int. Cl.[5] B23K *3/04*
U.S. Cl. 219—85.16 12 Claims



1. For use with a welding head having a series of spaced apart electrical terminals, an electrically and thermally conductive heater bar comprising in combination:
a. a bar shaped transverse member having a front heating surface and a rear surface; and
b. a plurality of spaced apart members, each member including at one end a connecting leg extending from the rear surface of said transverse member and terminating at its opposite end in a mounting pad adapted to engage a respective one of said electrical terminals; said heater bar being characterized in that said transverse member is slotted along planes which intersect at least some of said connecting legs.

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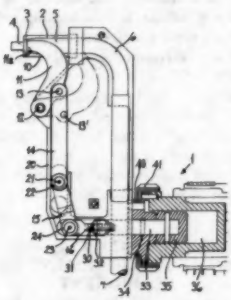
4,942,283
**STUD WELDING APPARATUS**
Bruno Mergell, Hainbuchenweg, Fed. Rep. of Germany, assignor to Emhart Industries, Inc., Towson, Md.
Filed Oct. 10, 1989, Ser. No. 419,304
Int. Cl.[5] B23K *9/20*
U.S. Cl. 219—98 3 Claims



1. A stud welding apparatus comprising
stud holder means including a cylindrical housing having gripping jaws at one end thereof,
stud feed tube means communicating with said cylindrical housing at the other end thereof,
axially extending slot means defined in said cylindrical housing, and
loading means including
a loading lever pivotally supported at one end for pivotal displacement from a retracted position remote from said cylindrical housing to an advanced position whereat the free end of said loading lever projects through said slot means between said gripping jaws and the end of said cylindrical housing which communicates with said stud feed tube, and engages a stud gripped by said gripping jaws and
means for pivotally displacing said loading lever between said advanced and retracted positions.

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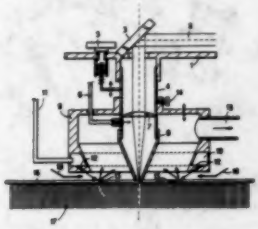
4,942,284
**LASER CUTTING APPARATUS PROVIDED WITH A GAS EVACUATION DEVICE**
Jean Etcheparre, and Bernard Etcheparre, both of Bordeaux, France, assignors to Lectra Systemes, France
Filed Feb. 22, 1989, Ser. No. 314,190
Claims priority, application France, Feb. 24, 1988, 88 02256
Int. Cl.[5] B23K *26/00*
U.S. Cl. 219—121.67 2 Claims



1. In a laser cutting apparatus comprising a laser radiation emitter, a focussing lens fixed in an adjustable sliding sleeve, said sleeve being extended, towards the material to be cut, by a truncated nozzle of which the small end is in the immediate vicinity of said material to be cut, said apparatus comprising a gas-evacuation device constituted by a hood—called ejector—open towards the material to be cut and fixed on said sliding sleeve,
said ejector comprises, on its periphery and on its open face lying opposite the material to be cut, openings allowing the injection of gas-air along convergent axes, and, in its upper part, a pipe for evacuating the gases.

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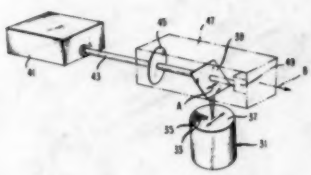
4,942,285
**METHOD FOR WELDING METAL HONEYCOMB CARRIER**
Hiroyuki Ishikawa, and Hiroyasu Koizumi, both of Tokyo, Japan, assignors to Calsonic Corporation, Tokyo, Japan
Filed Nov. 6, 1989, Ser. No. 431,750
Int. Cl.[5] B23K *26/00*
U.S. Cl. 219—121.64 12 Claims



1. A method for welding a metal honeycomb carrier by radiating laser beam to one end surface of a core section formed of metal corrugated and flat plates to mutually weld said corrugated and flat plates, said method comprising:
moving said laser beam in the direction perpendicular to the welding direction while oscillating at a certain amplitude and

masking the amplitude end of said laser beam and its neighboring area on the end surface of said core section.

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4,942,286

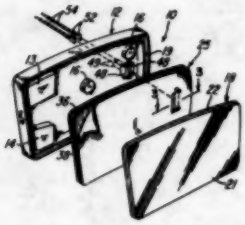
**APPARATUS FOR HEATING A MIRROR OR THE LIKE**

Robert P. Monter, and Ronald L. Smith, both of Dayton, Ohio, assignors to Thermacon, Inc., Dayton, Ohio

Continuation-in-part of Ser. No. 120,325, Nov. 13, 1987, abandoned. This application Feb. 6, 1989, Ser. No. 307,051

Int. Cl.[5] H05B *3/84*

U.S. Cl. 219—219 7 Claims



1. A mirror and heater assembly comprising a mirror having a predetermined shape and size, a single layer of conductive polymer having opposite parallel flat surfaces providing said layer with a substantially uniform thickness, said polymer having a positive temperature coefficient of resistivity, a set of continuous metal foils bonded to said opposite surfaces of said layer and cooperating to form a laminated heater assembly having a uniform thickness with only said single layer of said polymer between said foils, said metal foils and said polymer layer having the same size and shape, means for attaching one of said metal foils forming one side of said heater assembly to said mirror, an integral portion of said laminated heater assembly projecting laterally outwardly from the plane of said heater assembly to form a connecting tab, means for connecting a pair of electrical conductors to the portions of said metal foils on said tab, and said heater assembly being effective to heat substantially the entire mirror according to variations in temperature of different areas of the mirror.

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4,942,287

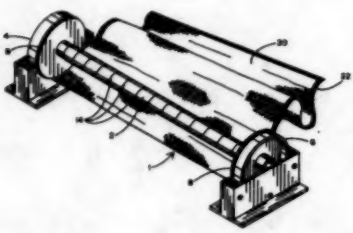
**LINOLEUM ROLL HEATER ASSEMBLY**

Paul Walker, 233 W. Cirton, Corona, Calif. 91720

Filed Jun. 19, 1989, Ser. No. 367,885

Int. Cl.[5] H05B *3/58*

U.S. Cl. 219—385 13 Claims



1. A heater assembly for heating a roll of material having a hollow core, said heater assembly comprising:

a heating tube to be inserted through the core of the roll of material;

an electrical heating element extending along said heating tube and adapted to be powered from an electrical source to provide heat to the roll of material;

cover means to surround the roll of material and prevent the loss of heat therefrom;

first and second end caps attached to opposite ends of said heating tube to retain the roll of material therebetween, at least one of said end caps being detachable from said heating tube to permit said heating tube to be inserted through the core of the roll of material; and

means by which to removably attach said cover means to said first and second end caps when said cover means surrounds the roll of material.

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4,942,288

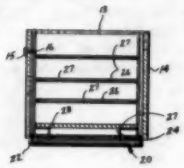
**BAKING OVEN**

Dillard D. Worsham, and Janet M. Worsham, both of P.O. Box 507, Delhi, Calif. 95315

Filed Mar. 10, 1989, Ser. No. 321,790

Int. Cl.[5] F24C *7/00, 15/34*

U.S. Cl. 219—399 11 Claims



1. A baking oven comprising,

a hood means including a top wall, a rear side wall, and spaced first and second side walls integrally secured together, and

a closure door pivotally mounted to a first side wall and selectively securable to a second side wall, and

wherein said hood means is removably mounted for overlying engagement with a base portion;

said base portion including a base member, said base member including a top surface with a heating element mounted fixedly thereon with a rack extending upwardly from said base member in surrounding relationship to said heating element, and

a heat slab mounted overlying said heating element, and

wherein said heating element includes a continuously formed and upwardly extending heat shield formed about said heating element, and

wherein said heat slab is selectively postionable upon an upper surface of said heat shield.

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4,942,289

**ELECTRIC HEATING ELEMENT WITH PTC COMPONENT**

Hanno Roller, Kandel, and Roland Starck, Rülzheim, both of Fed. Rep. of Germany, assignors to Fritz Eichenauer GmbH & Co. KG, Kandel, Fed. Rep. of Germany

Filed May 3, 1989, Ser. No. 346,702

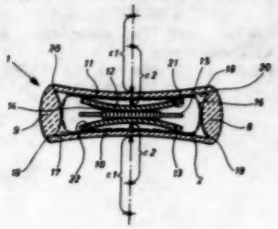
Claims priority, application Fed. Rep. of Germany, May 5, 1988, 3815306

Int. Cl.[5] H05B *3/10*

U.S. Cl. 219—504 11 Claims

1. Electric heating element with a contact unit formed from at least one PTC component and contact plates pressed flat on either side thereof, and pressed within a casing, characterized in that the contact plates and casing have a Brinell hardness of 80 to 100, that in the unpressed state of the heating element the contact plates are curved and rest with their convex side on the PTC component, that the casing is made from dimensionally

stable-light metal and in the unpressed state has an inner wall convexly facing the contact arrangement and having a finite



radius of curvature, which is larger than the radius of curvature of contact plates.

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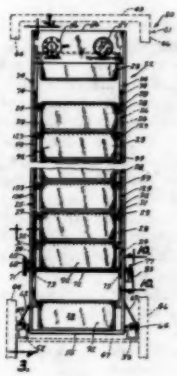
**4,942,290**

**DISPENSING MACHINE HAVING HORIZONTAL PRODUCT CARRIER MOVABLE THROUGH AN ELLIPTICAL-TYPE PATH**

David R. Frerking, Des Moines, Iowa, assignor to Fawn Engineering Corp., Des Moines, Iowa

Filed Dec. 27, 1988, Ser. No. 291,004
Int. Cl.[5] G06F 7/08
U.S. Cl. 235—381 14 Claims



1. In a dispensing machine:

a cabinet;

an endless, upright conveyor mounted within said cabinet having an elliptical-type shape, said elliptical-type shape having opposed vertical stretches;

a dispensing station formed adjacent one of said vertical stretches;

a plurality of product carriers, each carrier having support devices mounted on opposed ends thereof;

means mounting said carriers on said conveyor for movement in succession past said station;

stabilizer means rotatably connected to said mounting means and including a follower secured thereon, said support devices releasably connected to said stabilizer means; and

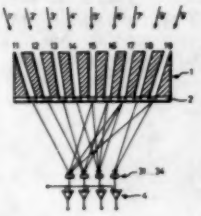
guide track means having elliptical-type guidepaths with vertical stretches extended parallel said vertical stretches of said conveyor, said follower of each stabilizer means engaged in at least one of said guidepaths whereby said carriers are maintained in a generally horizontally disposed position for receiving and holding product.

**4,942,291**

**POSITION-RESOLVING SENSOR FOR DETECTING INDIVIDUAL LIGHT FLASHES**

Klaus Dietrich, Gochsheim, Fed. Rep. of Germany, assignor to Messerschmitt-Bölkow-Blohm GmbH, Munich, Fed. Rep. of Germany

Continuation of Ser. No. 72,021, Jul. 10, 1987, abandoned. This application Mar. 27, 1989, Ser. No. 331,092
Claims priority, application Fed. Rep. of Germany, Jul. 29, 1986, 3625643
Int. Cl.[5] G01J 1/20; G01B 11/26
U.S. Cl. 250—203.3 12 Claims



1. A position-resolving sensor for detecting individual light flashes having a multiplicity of adjacent light-receiving elements and an evaluating circuit which determines the light-receiving element upon which a light-flash impinges, wherein the light-receiving elements are subdivided into a plurality of groups such that each group of light-receiving elements borders exclusively on light-receiving elements belonging to other groups, each group of light-receiving elements being associated with a number of light detectors, at least one optical connecting element establishing a light-conducting connection between each individual light-receiving element and the light detectors, said light detectors being selected from the number of light detectors in accordance with a defined code.

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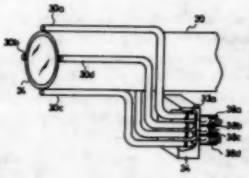
**4,942,292**

**APPARATUS FOR FOLLOWING SUN LIGHT**

Kiyoshi Ichimura, Tokyo; Kideaki Ito, Tokyo; Masaki Fuse, Tokyo; Chiaki Suematsu, Tokyo; Shingo Suzuki, Zama, and Satoshi Takahashi, Tokyo, all of Japan, assignors to Mitsubishi Rayon Co., Ltd., Tokyo, Japan

Filed Jun. 9, 1988, Ser. No. 206,831
Claims priority, application Japan, Jun. 11, 1987, 62-146025
Int. Cl.[5] G01J 1/20
U.S. Cl. 250—203.4 9 Claims



1. Apparatus for following sun light for use with sun light condensing apparatus with a lens and a plurality of light-collecting optical fibers whose one ends are arranged within a circular area where said sun light is intended to be condensed by said lens, said apparatus comprising:

(a) means for performing normal tracking in accordance with data including longitude and latitude of a place where said sun light condensing apparatus is mounted, number of days after vernal equniox and time;

(b) at least two pairs of light-receiving means each provided at opposite positions along the periphery of said circular

area in which said light-collecting optical fibers are arranged, each of said light-receiving means including an optical fiber having an end at a position immediately outside said circular area;

(c) a signal processing circuit responsive to output signals from said light-receiving means for producing a control signal when one of a said light receiving means senses incidence of sun light; and

(d) means for interrupting said normal tracking in the presence of said control signal and for moving said sun light condensing apparatus in a direction for one of a pair of said light-receiving means causing generation of said control signal which said one of said pair of said light-receiving means is not receiving sun light toward the other light-receiving means of said pair of light receiving means which is actually receiving sun light.

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**4,942,293**

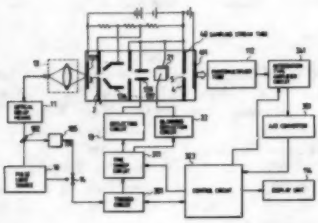
## OPTICAL WAVEFORM OBSERVING APPARATUS

**Musubu Koishi; Yutaka Tsuchiya; Tomoyoshi Hara, and Kenji Suzuki, all of Shizuoka, Japan, assignors to Hamamatsu Photonics Kabushiki Kaisha, Shizuoka, Japan**

**Filed Dec. 29, 1988, Ser. No. 291,822**

**Int. Cl.[5] H01J** *31/50*

**U.S. Cl. 250—213 VT** **18 Claims**



1. Optical waveform observing apparatus including a sampling streak tube for observing a waveform of an incident light beam having a repetitive frequency, the streak tube including means responsive to a repetitive deflecting trigger signal for deflecting in a sweep mode an electron beam corresponding to the incident light beam so that the electron beam can be sampled, the apparatus comprising:

electrical trigger signal means for generating an electrical trigger signal in synchronism with the repetitive frequency of said incident light beam;

time sweep means, operatively coupled to said trigger signal means, for stepwise delaying by a predetermined time period said electrical trigger signal to provide said deflecting trigger signal, said time sweep means effecting the stepwise delay in said deflecting trigger signal whenever the sampling operation is carried out a predetermined number of times; and

integration means for integrating sampling results, outputted by said streak tube, of the sampling operations carried out the predetermined number of times and providing a corresponding integrated sampling results.

**4,942,294**

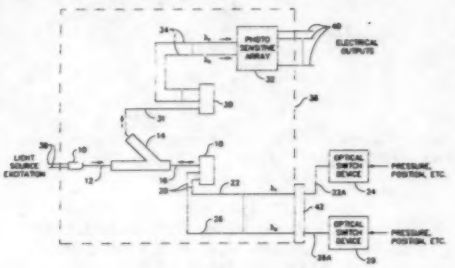
## FIBER OPTIC SENSING APPARATUS FOR MULTIPLEXING A PLURALITY OF OPTICAL SIGNALS OF DIFFERENT WAVELENGTHS OVER A SINGLE FIBER OPTIC CABLE

**James R. Witte, Cincinnati, Ohio, assignor to General Electric Company, Cincinnati, Ohio**

**Filed May 12, 1988, Ser. No. 192,999**

**Int. Cl.[5] H01J** *5/16*

**U.S. Cl. 250—227.14** **8 Claims**



1. An optical sensing system, comprising:

an electromagnetic radiation source emitting broadband electromagnetic radiation;

plurality of optical switch devices, each of said switch devices being responsive to physical conditions applied to it to modify and reflect electromagnetic radiation supplied to it;

a wavelength splitter/combiner for receiving said broadband electromagnetic radiation and separation said broadband radiation into a plurality of selected wavelengths, said wavelength splitter/combiner further including means for combining electromagnetic radiation reflected from said switch devices into one composite signal;

a plurality of optical fiber conductors, a separate conductor corresponding to each one of said plurality of optical switch devices, each of said conductor functioning to transmit a selected wavelength from said splitter/combiner to said conductor's corresponding switch device and to transmit reflected radiation from said conductor's corresponding switch device to said splitter/combiner;

an optical conductor for transmitting radiation from said radiation source to said wavelength splitter/combiner and for transmitting said composite signal from said splitter/combiner; and

means for extracting said composite signal from said last-recited optical conductor.

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**4,942,295**

## APPARATUS FOR ANGLE MEASUREMENT WITH INSTALLATION MEANS

**Arthur Brunner, Trostberg, and Johann Mitterreiter, Tachterting, both of Fed. Rep. of Germany, assignors to Johannes Heidenhain GmbH, Traunreut, Fed. Rep. of Germany**

**Filed May 25, 1989, Ser. No. 357,087**

**Claims priority, application Fed. Rep. of Germany, May 25, 1988, 3817612; Mar. 18, 1989, 3908932**

**Int. Cl.[5] G01D** *5/34*

**U.S. Cl. 250—231.13** **16 Claims**

1. An angle measurement apparatus, comprising:

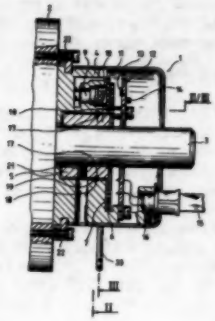
a graduation carrier;

a hub provided so as to connect the apparatus to a shaft and having stop faces;

a stationary scanning arrangement arranged so as to scan the graduation carrier; and

installation means for defining a positional correlation of the graduation carrier and the scanning arrangement, the installation means including at least one fastening element which is designed in the form of clamping elements provided so as to embrace the hub and cooperate with the

stop faces of the hub so as to fix the axial functional spacing and radial correlation between the graduation carrier



and the scanning arrangement, the clamping elements being provided in a defined positional relationship at the stationary scanning arrangement.

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4,942,296

## SUPER-CRITICAL FLUID MASS SPECTROMETER

David S. Jones, Sale, England, assignor to VG Instruments Group Limited, Crawley, England

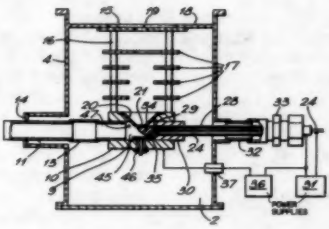
Filed Jul. 7, 1988, Ser. No. 216,092

Claims priority, application United Kingdom, Jul. 10, 1987, 8716252

The portion of the term of this patent subsequent to Dec. 27, 2005, has been disclaimed.

Int. Cl.[5] H01J 49/26

U.S. Cl. 250—288 15 Claims



1. A mass spectrometer for the analysis of a sample in solution in a super-critical fluid, said spectrometer comprising:

(a) means for reducing the pressure of said super-critical fluid solution and introducing at least some of the resulting sample-containing expanded fluid into an ionization chamber maintained substantially below atmospheric pressure;

(b) means for maintaining within said ionization chamber a glow discharge whereby to produce ions characteristic of said sample;

(c) means for extracting from said ionization chamber at least some of said ions, and

(d) means for mass analyzing at least some of the said ions extracted by said means for extracting.

4,942,297

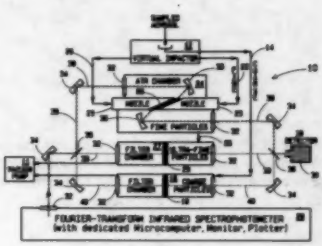
## REAL TIME INFRARED AEROSOL ANALYZER

Stanley A. Johnson, Countryside; Gerald T. Reedy, Bourbonnais, and Romesh Kumar, Naperville, all of Ill., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.

Filed Nov. 18, 1988, Ser. No. 273,395

Int. Cl.[5] G01N 21/01

U.S. Cl. 250—304 9 Claims




1. Apparatus for analyzing a sample from an aerosol environment, the sample having gaseous elements with suspended particles, comprising,

means for separating the sample into a plurality of size fractions,

means for collecting a first fraction in filter means, said collecting means having a first sealed chamber and said filter means being located inside said first chamber,

means for impacting a second fraction against an internal reflection element to which said second fraction adheres, said impacting means having a second sealed chamber and said internal reflection element being located inside said second chamber, and

means for analyzing said fractions through infrared spectrophotometry in essentially real time, without removing said filter means from said first chamber, or said internal reflection element from said second chamber,

said analyzing means including means for emitting infrared light, means for focusing and routing the infrared light through said first and second chambers, means for directing the infrared light alternately through said fractions, and means for measuring the infrared light and identifying the particles.

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4,942,298

## ELECTRON SPECTROMETER

John Comer, Stockport, United Kingdom, assignor to The Victoria University of Manchester, United Kingdom

PCT No. PCT/GB87/00118, § 371 Date Oct. 20, 1988, § 102(e) Date Oct. 20, 1988, PCT Pub. No. WO87/05151, PCT Pub. Date Aug. 27, 1987

PCT Filed Feb. 18, 1987, Ser. No. 235,872

Claims priority, application United Kingdom, Feb. 20, 1986, 8604256

Int. Cl.[5] H01J 49/44

U.S. Cl. 250—305 5 Claims

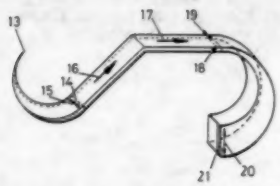
1. An electron spectrometer comprising:

an electron source for providing a beam of electrons having a predetermined energy spectrum,

an electron selector for dispersing in energy the electrons of the beam to produce an elongate selector image each portion of the length of which comprises electrons having a predetermined respective energy,

means for focussing the selector image on a target to produce an elongate target image including scattered electrons having a range of energies, each portion of the length of the target image resulting from a respective portion of the length of the selector image, and

an analyzer for dispersing in energy the scattered electrons of the target image, the analyzer being orientated such that the electrons are dispersed in a direction substantially perpendicular to the length of the target image,




whereby the analyzer produces a rectangular image made up of substantially parallel strips each including electrons of a range of energies but each resulting from the scattering by the target of electrons of a respective energy.

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**4,942,299**

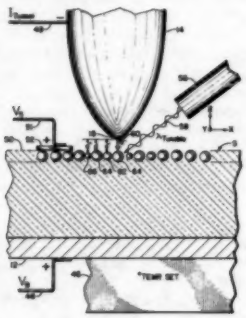
**METHOD AND APPARATUS FOR DIFFERENTIAL SPECTROSCOPIC ATOMIC-IMAGING USING SCANNING TUNNELING MICROSCOPY**

**Lawrence L. Kazmerski, Lakewood, Colo., assignor to Midwest Research Institute, Kansas City, Mo.**

**Filed Mar. 1, 1989, Ser. No. 317,466**

**Int. Cl.[5] H01J *37/00***

**U.S. Cl. 250—306** **23 Claims**



16. Spectroscopic scanning tunneling microscope (SSTM) apparatus for differential atomic imaging the surface of a material sample, comprising:

a mounting stage for mounting the sample;

a fine-pointed electrode probe positioned adjacent said mounting stage and being positionable very closely adjacent a sample that is mounted on said stage to accommodate a tunneling current between the sample and the probe;

tunable electronic surface bias means connected to the surface of the sample and to the probe for electronically biasing the surface of the sample in relation to the probe with a surface voltage bias;

photon bias means adjacent the stage for providing photon biasing of selected wavelengths and frequencies on the surface of the sample adjacent the probe;

instrumentation means for measuring tunneling current through the probe and electronic voltage bias;

data processing means connected to said instrumentation means and to said photon bias means for collecting, processing, and storing tunnel current, surface voltage bias, and photon bias data and for calculating and comparing tunnel current to voltage bias relationships in the presence and absence of photon biasing to determine atomic bonding and atomic species in the bonding; and

display means connected to said data processing means for producing a visual display of atoms present in the surface of the material including a visually identifiable representation of the individual species of each atom.

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**4,942,300**

**ELECTRON BEAM IMAGE RECORDING USING STIMULABLE PHOSPHOR SHEET OF REDUCED THICKNESS AND/OR WITH NO PROTECTIVE LAYER**

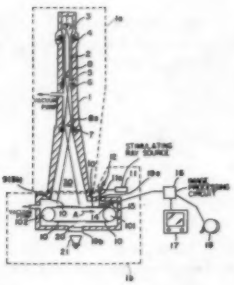
**Nobufumi Mori; Yuichi Hosoi, and Kenji Takahashi, all of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Nov. 18, 1985, Ser. No. 799,261**

**Claims priority, application Japan, Nov. 16, 1984, 59-240456; Nov. 16, 1984, 59-240457; Nov. 16, 1984, 59-240458**

**Int. Cl.[5] G01T *1/29, 1/105***

**U.S. Cl. 250—327.2** **4 Claims**



1. A method for recording and reproducing an electron beam image information comprising:

recording an electron beam image transmitted through or reflected from a sample as an electron beam energy latent image on a stimulable phosphor sheet comprising a stimulable phosphor layer which contains substantially no phosphor particle in its surface phase and has an exposed surface with no protective layer thereon;

irradiating said stimulable phosphor sheet with an electromagnetic wave to release at least a portion of electron beam energy stored in said stimulable phosphor sheet and stimulated emission;

detecting the stimulated emission;

and

photoelectrically processing the detected stimulated emission to obtain an electron beam image information of the sample.

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**4,942,301**

**THERMAL IMAGING DEVICE**

**Roger Voles, London, England, assignor to Thorn EMI Electronics Limited, Hayes, England**

**Filed Jun. 1, 1989, Ser. No. 359,882**

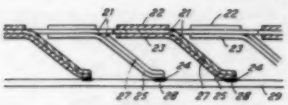
**Claims priority, application United Kingdom, Jun. 1, 1988, 8812958**

**Int. Cl.[5] H01L *27/14***

**U.S. Cl. 250—338.3** **9 Claims**

1. A thermal imaging device comprising: a layer comprising pyroelectric material; an array of discrete electrodes carried on one major surface side of the layer; an array of interconnected electrodes carried on the other major surface of the layer so as to define with the layer and discrete electrodes an array of pyroelectric detector elements; an array of electrically conductive contacts carried on said one surface of the layer, each

conductive contact being connected to a respective discrete electrode by an elongate electrically conductive strip, portions of the layer each carrying at least one contact and part of the associated conductive strip being formed into tongues attached



to the major portion of the layer along only part of their peripheries, the free ends of the tongues being pulled out of the plane of the layer, each contact being electrically connected to a respective input of a signal processing means.

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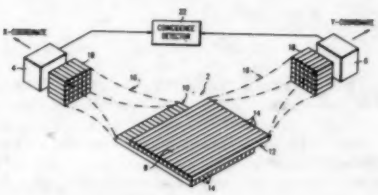
**4,942,302**

## LARGE AREA SOLID STATE NUCLER DETECTOR WITH HIGH SPATIAL RESOLUTION

**Walter Koechner, Great Falls, Va., assignor to Fibertek, Inc., Herndon, Va.**

**Filed Feb. 9, 1988, Ser. No. 154,004**
**Int. Cl.[5] G01T 1/20, 1/172**
**U.S. Cl. 250—368** **15 Claims**



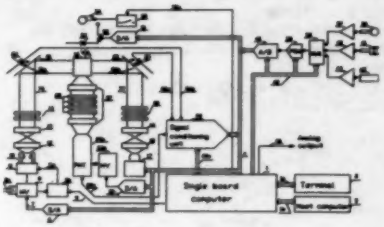
1. A nuclear radiation detector system comprising:
a first set of optical fibers;
a second set of optical fibers;
a first predetermined section of each of said fibers in said first set arranged side by side in a common plane to form a first linear array;
a first predetermined section of each of said fibers in said second set arranged side-by-side in a common plane to form a second linear array;
said first and second linear arrays being arranged orthogonally to define a matrix of rows and columns of fibers for sensing the presence of a nuclear particle and converting the nuclear radiation energy thereof to optical energy;
a second predetermined section of each of said fibers in said first set arranged in a bundle to form a first planar array wherein an open end of each of said fibers from an end surface of said first planar array to provide an output for optical energy generated in said first set of optical fibers;
a second predetermined section of each of said fibers in said second set arranged in a bundle to form a second planar array wherein an open end of each of said fibers form an end surface of said second planar array to provide an output for optical energy generated in said second set of optical fibers; and;
detector means coupled to said first and second planar arrays for measuring the optical energy output thereof to determine the location of the sensed nuclear particle.

**4,942,303**

## COMPUTER CONTROLLED FLUOROMETER DEVICE AND METHOD OF OPERATING SAME

**Zbigniew Kolber, Shoreham, and Paul Falkowski, Stony Brook, both of N.Y., assignors to Associated Universities, Inc., Washington, D.C.**

**Filed Jan. 31, 1989, Ser. No. 304,273**
**Int. Cl.[5] G01N 21/64, 21/62, 21/63, 21/00**
**U.S. Cl. 250—458.1** **14 Claims**



1.. A computer controlled fluorometer device for conveniently making rapid and accurate measurements of plant or phytoplankton photosynthetic parameters including ranges of variable fluorescence, $\Delta\phi_{psii}$, absorption cross section, $\sigma$(PSII), decay kinetics of variable fluorescence, and levels of energy transfer between PSII units in either essential darkness or under background illumination, comprising:
(a) a pump flash source, a probe flash source, a sample chamber having a cavity for containing a sample of plant or phytoplankton to be measured, a programmable computer means including a microprocessor, and data and address bus means and D/A converters for operatively connecting said computer means to enable the computer means when programmed to control energy, increment, repetition, and sequencing of both said pump flash source and said probe flash source;
(b) light filter, collimator, and reflector means arranged in operating relationship between said pump flash source and the sample chamber, and between said probe flash source and the sample chamber, for directing pump flashes and probe flashes, produced, respectively, by said flash sources, into the sample chamber;
(c) a light condenser lens system, emission filters, and a fluorescence detector with a photomultiplier (PMT) arranged in series to collect light emitted from said sample chamber and direct it into the PMT, said PMT being operable to produce a signal that corresponds to said light directed into the PMT, the operation of said PMT being controlled by a power supply that is operably connected to it and to said computer means from which control signals are transmitted to the power supply;
(d) signal conditioning unit and two flash monitoring means, each operatively connected, respectively, to monitor pump flash light each probe flash light generated by said flash sources, said monitoring means being further operably connected to transmit signals corresponding to said monitored flashes to said signal conditioning unit, said signal conditioning unit being operably connected to be controlled by, and to transmit signals to, said microprocessor;
(e) a software programmable source of background irradiance, said programmable source being operably connected to receive programmed signals from said microprocessor, and being arranged to emit light into said sample chamber; and
(f) a computer program installed to run said microprocessor, thereby to control the operation of said flash sources, said power supply controlling the PMT, and said signal control unit, to enable the fluormeter device to make said

measurements, said computer program being further operable to control said computer means to collect, analyze, and store data relating to said measurements.

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**4,942,304**

**ION IMPLANTATION**

**Malcolm E. Boston, Cambridge, United Kingdom, assignor to Tecvac Limited, United Kingdom**

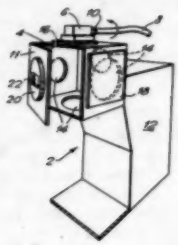
**PCT No. PCT/GB87/00691, § 371 Date May 24, 1988, § 102(e) Date May 24, 1988, PCT Pub. No. WO88/02589, PCT Pub. Date Apr. 7, 1988**

**PCT Filed Sep. 30, 1987, Ser. No. 197,408**

**Claims priority, application United Kingdom, Sep. 30, 1986, 8623453**

**Int. Cl.[5] H01J *37/317***

**U.S. Cl. 250—492.3** **12 Claims**



1. Ion implantation apparatus comprising a vacuum chamber and an ion source, the ion source being moveable so as to enable ions to be directed onto a stationary target from a plurality of different directions, wherein the ion source in use is coupled to a flexible cable supplying gas and a high tension thereto, and wherein the end of the flexible cable remote from the ion source is coupled to a high tension supply and to a gas supply, a valve being provided to regulate the flow of gas; the valve is connected to the high tension supply so that in use the valve may be maintained at high tension.

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**4,942,305**

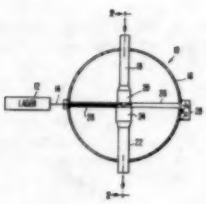
**INTEGRATING SPHERE AEROSOL PARTICLE DETECTOR**

**Holger T. Sommer, Greenbelt, Md., assignor to Pacific Scientific Company, Newport Beach, Calif.**

**Filed May 12, 1989, Ser. No. 350,769**

**Int. Cl.[5] G01N *15/06***

**U.S. Cl. 250—574** **10 Claims**



1. Apparatus for detecting particles in a gas stream comprising:

an integrating sphere having an interior surface;

means for conducing the gas stream through said integrating sphere;

means for projecting a collimated light beam transversely through said gas stream in said integrating sphere, whereby the particles in the gas stream scatter light from said light beam;

means for detecting light scattered from said light beam within said integrating sphere, said light detecting means comprising a plurality of photodetectors mounted on said integrating sphere,

and coincidence detection means for detecting the simultaneous light detection by at least two of said photodetectors.

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**4,942,306**

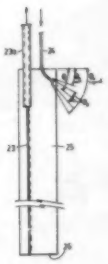
**FIBRE OPTIC SENSOR FOR THE CONTINUOUS MEASUREMENT LIQUIDS LEVEL AND OTHER PARAMETERS**

**Paul D. Colbourne, Dartmouth, Canada, assignor to Focal Technologies Incorporated, Dartmouth, Canada**

**Filed Dec. 30, 1988, Ser. No. 292,111**

**Int. Cl.[5] G01N *15/06***

**U.S. Cl. 250—577** **17 Claims**



1. An indicating device for showing the level of the interface between two fluids in a container, wherein one fluid has a higher index of refraction than the other, comprising at least two optical fibres, each having at least a portion thereof embedded in a transparent substrate material of similar refractive index to that of the fluid with a higher refractive index, one of said fibres being a source fibre optically connected to a light source, the other being doped with a fluorescent doping material and being a detector fibre optically connected to a detector, the fibres being arranged within the substance such that light emitted from said source fibre illuminates the interior of the substrate, which serves as a larger waveguide, and (a) is coupled into said detector fibre when total internal reflection occurs at the substrate/fluid interface, which is the case when air or a fluid of relatively low refractive index is present, or (b) is not coupled into said detector fibre when refraction occurs at the substrate/fluid interface, which is the case when the fluid of higher refractive index, namely the fluid whose level is to be measured, is present.

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**4,942,307**

**ENGINE STARTER APPARATUS**

**Akira Morishita, and Shuzoo Isozumi, both of Himeji, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Dec. 14, 1988, Ser. No. 284,029**

**Claims priority, application Japan, Dec. 24, 1987, 62-199048**

**Int. Cl.[5] F02N *11/08***

**U.S. Cl. 290—38 R** **3 Claims**

1. An engine starter apparatus comprising

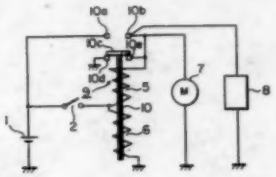
an electric source;

a starter motor connected to said electric source;

a solenoid switch connected between said electric source and said starter motor, said solenoid switch being movable between a closed position in which said electric source is

connected to said starter motor and an open position in which said electric source is disconnected from said starter motor;

a supplemental fuel supplier connected in parallel to said



starter motor for supplying additional fuel to the engine when said starter motor is energized; and

short-circuiting means connected to said starter motor for directly short circuiting said starter motor when said solenoid switch is in said open position.

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**4,942,308**

**POWER TRANSISTOR MONOLITHIC INTEGRATED STRUCTURE**

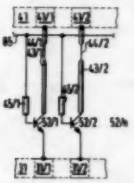
**Gerhard Conzelmann, Leinfelden-Oberaichen; Karl Nagel, Gomaringen, and Gerhard Fiedler, Neckartailfingen, all of Fed. Rep. of Germany, assignors to Robert Bosch GmbH, Stuttgart, Fed. Rep. of Germany**

**Filed Jan. 25, 1989, Ser. No. 301,821**

**Claims priority, application Fed. Rep. of Germany, Jan. 30, 1988, 3802794**

**Int. Cl.[5] H03K *17/60*; H01L *27/082***

**U.S. Cl. 307—202.1** **6 Claims**



1. A bipolar power transistor monolithic integrated structure made by epitaxial technology, comprising a plurality of parallel connected transistor cells each containing at least one component transistor and transistor electrode terminals, said transistor cells being electrically isolated one from each other; a conductor web leading to an external collector terminal of the power transistor structure; means for connecting collector terminals of said transistor cells to said collector conductor web, said connecting means including a plurality of branch conductors for connecting said collector terminals of the transistor cells to external connection spots connected to said conductor web, each of said branch conductors being provided with a fuse link dimensioned such as to melt when a defect occurs in the associated transistor cell and thereby to separate the defective component transistor; a common cell base control conductor, the base of said at least one component conductor in respective cells being coupled to said common base control conductor via an additional fuse link to disconnect in the event of a defect the base control conductor from the component transistor; and a plurality of electronic controlled switches connected between said common conductor web and the ends of respective additional fuse links remote from the base of the component transistor in respective transistor cells, each of said switches having a control electrode coupled to the collector of the assigned component transistor.

**4,942,309**

**HIGH SIDE DRIVER MOS CIRCUIT**

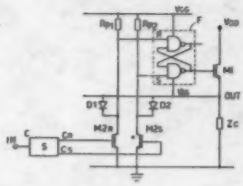
**Davide Chieli, Milan, Italy, assignor to SGS-Thomson Microelectronics, s.r.l., Italy**

**Filed Feb. 22, 1989, Ser. No. 313,556**

**Claims priority, application Italy, Feb. 25, 1988, 83616 A/88**

**Int. Cl.[5] H03K *17/16, 17/60***

**U.S. Cl. 307—270** **5 Claims**



1. A high side driver circuit for switching a supply voltage $V_{DD}$ across a load Zc by means of a power switching transistor M1, which has a drain connected to the supply voltage rail $V_{DD}$, and a source connected to a terminal of the load, the other terminal of the load being connected to the ground, with said power switching transistor being driven by a driving circuit controlled by a drive switching signal C, said circuit comprising;

an input circuit means having an input terminal to which said drive switching signal C is applied, said input circuit means producing at two output terminals thereof, a first pulse signal $C_S$ which is a positive pulse coinciding with a falling edge of said switching signal C and a second pulse signal $C_R$ which is a positive pulse coinciding with a rising edge of said switching signal C, respectively;

a first transistor M2S having a grounded source and being driven by said first signal $C_S$, said first transistor having a drain connected through a load element capable of maintaining the said potential of said transistor at a stationary logic 1 level, when said transistor is turned OFF from a supply node $V_{GG}$ of the circuit;

a second transistor M2R having a grounded source and being driven by said second pulse signal $C_R$ and having a drain connected through a load element capable of maintaining the drain potential of said transistor at a stationary logic 1 level when said transistor is turned OFF from said supply node $V_{GG}$ of the circuit;

a SET-RESET type flip-flop having a SET input terminal connected to the drain of said first transistor M2S and a RESET input terminal connected to the drain of said second transistor M2R and having an output terminal connected to the gate of said power switching transistor M1;

wherein a constant potential difference is being maintained between said supply node $V_{GG}$ of the circuit and the source of said power switching transistor M1 by means of a voltage generator, and wherein said driving circuit dissipates only during transitions from one state to another.

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**4,942,310**

**ARRANGEMENT FOR THE TRANSFORMATION OF AN ELECTRICAL MULTIPHASE SIGNAL INTO A FREQUENCY**

**Franz Renggli, Buchrain, and Andreas Joder, Unterägeri, both of Switzerland, assignors to LGZ Landis & Gyr Zug AG, Zug, Switzerland**

**Filed Mar. 17, 1989, Ser. No. 325,135**

**Int. Cl.[5] H03L *7/00*; H03K *5/22***

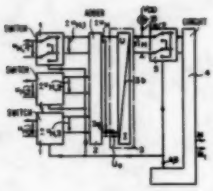
**U.S. Cl. 307—271** **4 Claims**

1. An arrangement for converting a multiphase electric signal into a frequency comprising:

an adder circuit for adding the phases comprising said multiphase signal,

one first polarity reversing switch for each phase in said multiphase signal,

at least one voltage/current converter connected downstream of said first polarity reversing switches,

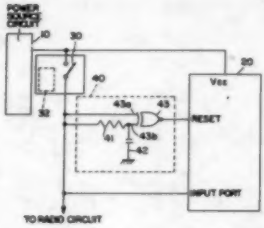


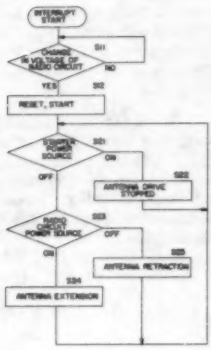
at least one second polarity reversing switch connected downstream of said voltage/current converter,

a control circuit for generating a periodic switch-over signal for controlling said first and second polarity reversing switches, and

a constant current source connected at an input of said one second polarity reversing switch.

prevented during a change in condition of said power switch of said automobile radio and said automobile antenna is retracted when said power switch is off and extended when said power switch is on.




| OPERATION OF POWER SOURCE SWITCH 30 | OFF | ON | | OFF | |
|---|---|---|---|---|---|
| INPUT TERMINAL 42a | 0 | 1 | 1 | 0 | 0 |
| INPUT TERMINAL 42b | 0 | 0 | 1 | 1 | 0 |
| OUTPUT OF EX NOR 43 | 1 | 0 | 1 | 0 | 1 |
| ACTUATION OF MICROCOMPUTER 20 | SET | RESET | SET | RESET | SET |

## 4,942,311
## RESET CIRCUIT FOR AN AUTOMOBILE ANTENNA CONTROL DEVICE

**Takuji Harada, Kanagawa, Japan, assignor to Harada Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 254,356, Oct. 6, 1988, abandoned. This application Dec. 4, 1989, Ser. No. 449,506**

**Claims priority, application Japan, Aug. 10, 1987, 62-254246**

**Int. Cl.[5] H01Q** *1/32;* **H03K** *17/22, 17/20, 17/06*

**U.S. Cl. 307—272.3** **3 Claims**

1. An automobile antenna control device comprising:

a microcomputer which is constantly supplied with electric power for controlling extension and retraction of said automobile antenna, said microcomputer having a reset input and an input port;

means for generating a reset signal only when a condition of a power switch of an automobile radio changes from off to on or on to off; and

a means for sensing a condition of said power switch of said automobile radio, said sensing means having an ouput thereof coupled to said generation means and said input port of said microcomputer;

whereby run away operation of said microcomputer can be

## 4,942,312
## INTEGRATED-CIRCUIT HAVING TWO NMOS DEPLETION MODE TRANSISTORS FOR PRODUCING STABLE DC VOLTAGE

**Eric G. Stevens, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 19, 1985, Ser. No. 766,994**

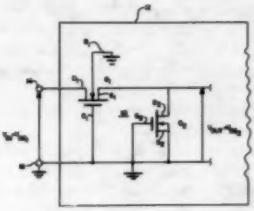
**Int. Cl.[5] H03K** *3/013, 17/16, 19/003;* **H02P** *7/06*

**U.S. Cl. 307—296.8** **6 Claims**

1. An integrated-circuit which in response to a variable DC input voltage produces a stable DC output voltage, comprising:

a. first and second NMOS depletion mode transistors each having gate, drain and source electrodes electrically connected as follows the source electrode of the first transistor and the drain electrodes of the second transistor being connected, the gate electrodes of both transistors and the source electrode of the second transistor being connected to a reference potential and the drain electrode of the first

transistor being connected to the variable DC input voltage; and



b. parameters of the first and second transistors being selected so that the desired stable DC voltage is produced at the electrical junction of the connected source and drain electrodes.

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**4,942,313**

## METHOD FOR DETECTING A CURRENT FLOWING OVER THE HUMAN BODY BETWEEN A FORWARD AND A RETURN CONDUCTOR AND A CIRCUIT CONFIGURATION FOR CARRYING OUT THE METHOD

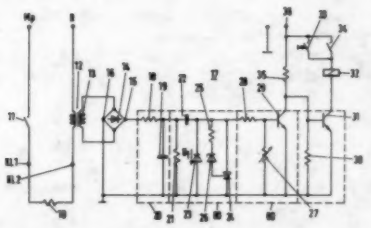
**Helmut Kinzel, Weinheim, Fed. Rep. of Germany, assignor to Asea Brown Boveri Aktiengesellschaft, Mannheim, Fed. Rep. of Germany**

**Filed Aug. 17, 1988, Ser. No. 233,242**

**Claims priority, application Fed. Rep. of Germany, Aug. 29, 1987, 3728906**

**Int. Cl.[5] H02H *1/02*; A61B *17/36***

**U.S. Cl. 307—326** **13 Claims**



1. Method for detecting a current flowing through a human body between forward and return main network conductors at a given network voltage, and for switching off the main network conductors, which comprises detecting a current increase through the human body by means of an output signal emitted by a current sensor connected in one of the network conductors, actuating a switch for switching off the main network conductors only if a value of the output signal of the current sensor is between a lower and an upper threshold value, wherein said lower threshold value represents a current that is of just no danger to a human body, and the upper threshold value represents a maximal allowable current value through a human body, at said given network voltage, rectifying the output signal of the current sensor in a rectifier, differentiating the rectified output signal in a differentiating section, supplying the rectified output signal to a discriminator circuit after differentiation, and limiting a window of the discriminator circuit by the lower and upper threshold values.

**4,942,314**

## PEAK HOLDING CIRCUIT FOR A COLOR TELEVISION RECEIVER

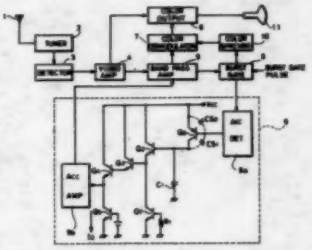
**Nobukazu Hosoya, Nara; Kazunori Nohara, Osaka; Yasuyuki Ikeguchi, Higashiosaka; Tooru Sasaki, Matsubara, and Yoshichika Hirao, Neyagawa, all of Japan, assignors to Sanyo Electric Co., Ltd., Moriguchi, Japan**

**Filed Sep. 16, 1988, Ser. No. 245,179**

**Claims priority, application Japan, Sep. 18, 1987, 62-235428; Sep. 18, 1987, 62-235430**

**Int. Cl.[5] H04N *5/18*; H03K *5/159***

**U.S. Cl. 307—352** **6 Claims**



1. A peak holding circuit for holding a peak level of an input signal, comprising:

means for supplying said input signal;

means for holding the peak level of said supplied input signal;

a darlington circuit comprising a plurality of transistors connected in a darlington manner for supplying an output signal in response to the peak level held in said holding means, said darlington circuit having at least a first stage output transistor; and

at least one current cancelling transistor having an emitter connected to ground and a collector connected to an emitter of said first stage output transistor out of said plurality of transistors connected in a darlington manner wherein a collector cut-off current flowing between said collector and said emitter of said current cancelling transistor being approximately equal to a collector cut-off current flowing through said first stage output transistor out of said plurality of transistors connected in a darlington manner.

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**4,942,315**

## BASE POINT FLOATING CUT OFF WAVE FORM DIFFERENTIAL SIGNAL DETECTOR CIRCUIT

**Lin J. Tarng, 211, Sec. 4, Fu-Hsing Rd., Taichung City, Taiwan, China**

**Continuation of Ser. No. 66,539, Jun. 26, 1987, abandoned. This application Aug. 14, 1989, Ser. No. 394,256**

**Int. Cl.[5] H03K *5/08, 5/153***

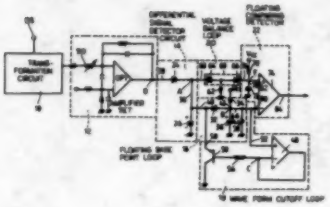
**U.S. Cl. 307—358** **1 Claim**

1. In a differential signal detector circuit comprising differential-signal input means comprising an amplifier for providing an amplified differential signal from a sensor, a differential signal detector for detecting the amplified differential signal to provide a detecting signal and a comparing detector having a timer with a time constant for comparing the detecting signal with a base point signal and providing a differential signal detection signal when the detected differential signal differs sufficiently from the base point signal, a floating base point signal improvement, comprising:

a floating base point loop (16) for providing the base point signal, the floating base point loop comprising a base point value setting element (38) for setting a maximum value of the base point signal, a timer element (36) having a time constant and a charging element (34) for timing charging

of the base point value setting element to the maximum base point value, the time constant of the timer element being longer than the time constant of the timer in the comparing detector, and a fixed directional impedance element (32) connecting the base point value setting element to the differential signal detection circuit for affecting the detecting signal thereof;

a wave form cutoff loop (18) comprising a current amplifying element (48) responsive to the timed charge to the maximum base point value of the floating base point loop and a clipping element (50) responsive to the current



amplifying element for cutting off the affect of the floating base point loop on the detecting signal of the differential signal detection circuit; and

a voltage balance loop (20) comprising a pair of fixed voltage difference elements (64, 66) connected to each other for no directional impedance difference therebetween and a discharging element (62) connected between the pair of fixed voltage difference elements for voltage balance, the pair of fixed voltage difference elements connecting the differential signal detector circuit to the comparing detector.

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**4,942,316**

**CASCODE LOGIC CIRCUIT INCLUDING A POSITIVE LEVEL SHIFT AT THE INPUT OF THE TOP LOGIC STAGE**

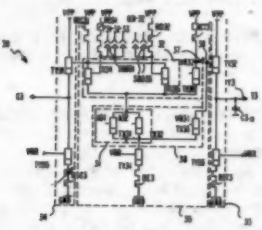
**Hervé Béranger, Fontainebleau; Armand Brunin, Le Mee sur Seine; Bruno Caplier, Mennecy, and Jean-Paul Rousseau, Nogent sur Marne, all of France, assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Nov. 25, 1988, Ser. No. 275,860**

**Claims priority, application European Pat. Off., Oct. 19, 1988, 87480023.8**

**Int. Cl.[5] H03K *19/086***

**U.S. Cl. 307—455** **7 Claims**



1. In a 2N level single-ended cascode logic circuit biased between a first supply voltage and a second supply voltage, wherein N is a positive integer greater than zero, said logic circuit of the type including

a logic tree including at least two stacking levels connected in a cascode configuration comprised of top and bottom stages having outputs that are dot-connected to perform predetermined logic function at the tree output;

at least one output circuit comprised of an emitter-follower transistor which is driven by the signal at said tree output;

wherein each stage includes a current switch each being comprised of at least one input transistor connected in a differential amplifier configuration with a reference transistor;

wherein said bottom stage provides a logical OR function;

apparatus comprising:

at least one input transistor of at least one of said top stages having its input coupled to level shift means for providing a positive voltage shift to an input signal applied thereto.

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**4,942,317**

**MASTER SLICE TYPE SEMICONDUCTOR INTEGRATED CIRCUIT HAVING 2 OR MORE I/O CELLS PER CONNECTION PAD**

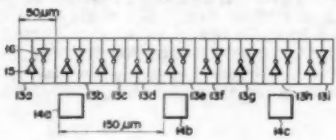
**Yasunori Tanaka, Yokohama; Teruo Kobayashi, Tokyo, and Masahiro Ishibashi, Yokohama, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 12, 1989, Ser. No. 351,001**

**Claims priority, application Japan, May 16, 1988, 63-118765**

**Int. Cl.[5] H03K *17/12***

**U.S. Cl. 307—465** **6 Claims**




1. A master slice type semiconductor integrated circuit comprising:

a plurality of pads arranged at a predetermined pitch; and

n, wherein n is an integer of 2 or more, I/O cells arranged for each of said plurality of pads, each I/O cell being provided with at least a buffer,

wherein the n number of I/O cells per pad is set in accordance with the pad pitch.

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**4,942,318**

**FOR CONDITIONING THE INPUT TO OR THE OUTPUT FROM AN INTEGRATED CIRCUIT**

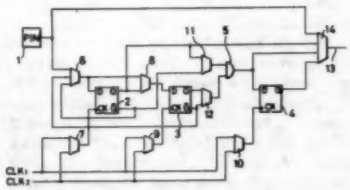
**Keiichi Kawana, Chiba, Japan, assignor to Kawasaki Steel Corporation, Hyogo, Japan**

**Filed Sep. 30, 1988, Ser. No. 251,467**

**Claims priority, application Japan, Oct. 2, 1987, 62-249185**

**Int. Cl.[5] H03K *19/177***

**U.S. Cl. 307—465** **15 Claims**



1. A programmable input/output circuit connected to an input terminal or an output terminal of an integrated circuit, comprising:

input terminal means for connecting the input terminal of an integrated circuit to the programmable input/output cir-

cuit or for connecting the integrated circuit to the programmable input/output circuit;

at least one storage element;

at least one combinational logic circuit;

output terminal means for connecting the programmable input/output circuit to the integrated circuit or for connecting the programmable input/output circuit to the output terminal of the integrated circuit; and

at least one programmable selector;

wherein: two or more signal lines from a plurality of signal lines including at least a signal line from said input terminal means, an output signal line from said storage element and an output signal line from said combinational logic circuit are connected to input terminals of said selector; and an output selected by said selector is directly connected to any one of output or input terminals including at least an input terminal of said storage element, an input terminal of said combinational logic circuit and said output terminal means.

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**4,942,319**

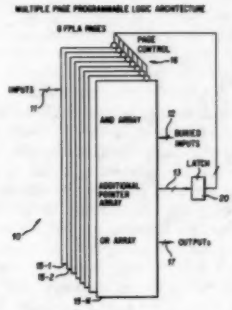
**MULTIPLE PAGE PROGRAMMABLE LOGIC ARCHITECTURE**

**Scott K. Pickett, San Jose; Thomas M. Luich, Campbell, both of Calif., and Arthur L. Swift, IV, Welches, Oreg., assignors to National Semiconductor Corp., Santa Clara, Calif.**

**Filed Jan. 19, 1989, Ser. No. 299,047**

**Int. Cl.[5] H03K *19/177***

**U.S. Cl. 307—465** **32 Claims**




1. A logic array circuit comprising:

a plurality of L input leads for receiving a plurality of input signals, where L is a first positive integer;

a set of N first logic arrays, where N is a second positive integer greater than or equal to one, each of said N first logic arrays including means for receiving signals related to selected ones of said input signals, a plurality of P intermediate output signal leads, a plurality of logic gates for providing P intermediate output signals on said P intermediate signal leads as a function of said signals related to selected ones of said input signals, where P is a third positive integer associated with that one of said N first logic arrays;

means for selecting a subset of D of said first logic arrays, where D is a fourth positive integer greater than or equal to one;

a set of M second logic arrays, where M is a fifth positive integer greater than or equal to one, each of said second logic arrays including one or more input leads for receiving input signals related to said intermediate output signals of said selected ones of said first logic arrays, a plurality of S output leads, where S is a positive integer, one or more logic gates for providing output signals on said S output leads as a function of said input signals of said second logic array;

means for selecting a subset of G of said M second logic arrays for receiving said input signals related to said intermediate output signals of said set of D of said first logic arrays and providing a set of output signals, where G is a sixth positive integer; and

means for controlling said means for selecting such that at least one of said means for selecting operates in response to one or more of said input signals.

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**4,942,320**

**TRANSISTOR CIRCUIT WITH IMPROVED α RAY RESISTANT PROPERTIES**

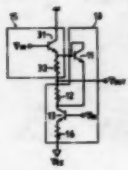
**Hiroyuki Itoh, Kodaira; Toshio Yamada, Kokubunji; Akira Masaki, Musashino, and Tohru Kobayashi, Iruma, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Jun. 17, 1988, Ser. No. 208,118**

**Claims priority, application Japan, Jun. 19, 1987, 62-151115**

**Int. Cl.[5] H03K *5/00, 3/01***

**U.S. Cl. 307—546** **42 Claims**



1. A transistor circuit comprising:

a first circuit means having at least a first resistor means and providing an output from one end of said first resistor means;

a first transistor having a base which receives a first bias;

second resistor means connected between a collector of said first transistor and the one end of said first resistor means; and

clamp means connected to the collector of said first transistor and clamping a voltage between the collector of said first transistor and the other end of said first resistor means.

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**4,942,321**

**RADIAL MAGNETIC BEARING SYSTEM**

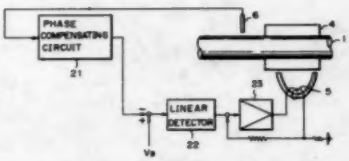
**Yoichi Kanemitsu, 3-7-24, Takada, Chigasaki-shi, Kanagawa-ken, Japan**

**Filed Oct. 5, 1988, Ser. No. 253,516**

**Claims priority, application Japan, Oct. 7, 1987, 62-254485**

**Int. Cl.[5] F16C *39/06***

**U.S. Cl. 310—90.5** **4 Claims**




1. A radial magnetic bearing system of the type having a rotor yoke made of a magnetic material which is rigidly secured to a rotary shaft, an electromagnetic stator rigidly secured to a casing with a minute gap provided between said stator and said rotor yoke, said stator having coils for generating magnetomotive force, a displacement sensor for measuring a relative displacement between said rotary shaft and said casing, and a combination of a phase compensation circuit and a power amplifier for controlling the level of magnetic attraction force acting between said rotor yoke and said electromag-

netic stator on the basis of a signal output from said displacement sensor, wherein the improvement comprises:

said electromagnetic stator being arranged to generate three magnetic attraction forces radially at equi-angular spacing of 120° within a plane perpendicular to the axis of said rotary shaft, and

said displacement sensor which has three displacement sensor element being arranged such that each sensor element measures displacement of said rotary shaft with respect to said casing in the direction of one of the three magnetic attraction forces generated by the electromagnetic stator.

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**4,942,322**

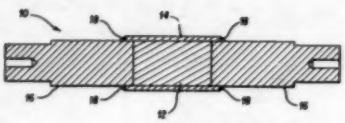
**PERMANENT MAGNET ROTOR WITH BONDED SHEATH**

**Derek Raybould, Denville; Gordon E. Fish, Verona, both of N.J., and Joseph Denk, Manhattan Beach, Calif., assignors to Allied-Signal Inc., Morris Township, Morris County, N.J.**

**Filed May 27, 1988, Ser. No. 199,632**

**Int. Cl.[5] H02K *1/06*; B22F *7/00***

**U.S. Cl. 310—156** **8 Claims**



1. A permanent magnet rotor assembly comprising a sheath, a high energy product permanent magnet contained within said sheath and metallurgically bonded thereto, and at least one shaft member, said shaft member being connected to an end of said sheath and said permanent magnet having been compacted and sintered within said sheath to provide between said permanent magnet and said sheath an interface wherein material from said permanent magnet and said sheath is diffused.

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**4,942,323**

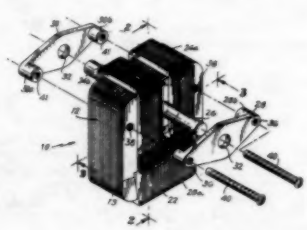
**TWO POLE ELECTRIC MOTOR WITH STATOR WINDING ENCIRCLING THE ROTOR**

**Dominic DeCesare, 223 Center St., Elizabeth, N.J. 07202**

**Filed Jul. 28, 1986, Ser. No. 890,134**

**Int. Cl.[5] H02K *3/28***

**U.S. Cl. 310—208** **22 Claims**



1. An AC induction electric motor comprising a rotor; a stator including a stator core having spaced opposing poles which generally define an air gap therebetween for receiving said rotor rotatably mounted on said stator, and having magnetic circuit means connected to said poles for providing a low reluctance return magnetic circuit both for the effective magnetic field crossing said air gap and passing through said rotor as well as leakage magnetic field which by-passes said rotor; and at least one stator rotor encircling winding at least partially overlapping said air gap and at least partially receiving a portion of said rotor, whereby substantially the entire magnetic field created by said at least stator one rotor encircling winding is forced to pass through said rotor with minimal leakage magnetic field bypassing said rotor, and the effectiveness of said at least one stator rotor encircling winding is optimized.

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**4,942,324**

**ROTOR FOR ROTARY ELECTRIC MACHINE**

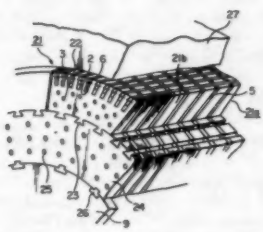
**Yuji Ooyama, and Toshinari Shimazu, both of Kobe, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Jan. 3, 1989, Ser. No. 292,941**

**Claims priority, application Japan, May 30, 1988, 63-130432**

**Int. Cl.[5] H02K *1/00, 1/28, 1/22***

**U.S. Cl. 310—216** **5 Claims**



1. A rotor for a rotary electric machine comprising:

a rotor shaft;

a clamping base fixed to said rotor shaft;

a circumferentially continuous cylindrical rotor core having axially spaced ends coupled to said clamping base and comprising a plurality of split sectors obtained by circumferentially dividing the rotor core, each split sector being removably attached by at least one joint to the clamping tool and being composed of a laminate of split sector pieces made of sector-shaped thin steel plates, each of said sectors being provided with coil slots at predetermined intervals on the outer periphery of the rotor core; and

at least one rotor coil inserted into each said coil slot at a predetermined pitch, the rotor coils in each split sector being connected to provide coil windings, the coil windings of each sector being separably connected at said axially spaced ends to coil windings of other split sectors so that each split sector can be separated from the clamping base without removing the coil windings from the coil slots located on said split sector.

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**4,942,325**

**ELECTRIC MOTOR**

**Katsuyoshi Fukaya, Aichi, Japan, assignor to Aisan Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Mar. 30, 1989, Ser. No. 330,807**

**Claims priority, application Japan, Apr. 18, 1988, 63-50865**

**Int. Cl.[5] H02K *1/12***

**U.S. Cl. 310—257** **6 Claims**

1. An electric motor which comprises:

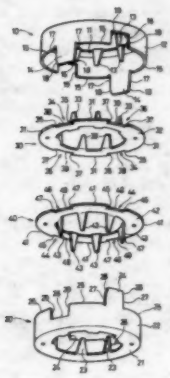
first and second cup shaped members each having an annular bottom portion disposed substantially in a perpendicular relationship to an axis and centered at the axis, a circumferential surface portion having a cylindrical wall connected to an outer circumferential edge of said bottom portion and extending in a concentrical relationship with the axis, and a plurality of magnetic pole pieces connected to an inner circumferential edge of said bottom portion and extending in a concentrical relationship with the axis in the same direction as said circumferential surface portion, said magnetic pole pieces being disposed in a predetermined angularly spaced relationship from each other around the axis, and

first and second magnetic pole plates each having an annular

plate-formed portion extending in a plane perpendicular to the axis, and a plurality of magnetic pole pieces connected to an inner circumferential edge of said plate-formed portion and disposed in a concentrical relationship with the axis and in the same predetermined angularly spaced relationship from each other around the axis, said magnetic pole pieces being positioned on the same cylindrical plane with said magnetic pole pieces formed on said first and second cup shaped members,

wherein said magnetic pole pieces provided on said first magnetic pole plate are aligned between said magnetic pole pieces provided on said first cup shaped member while said magnetic pole pieces provided on said second magnetic pole plate are aligned between said magnetic pole pieces provided on said second cup shaped member, and wherein said first and second magnetic pole plates contact each other and are assembled in concentrical relationship together with said first and second cup shaped members with a pair of stator armatures disposed between said circumferential surface portions of said first and second cup shaped members and said magnetic pole pieces and with a rotor armature disposed in the inside of said aligned magnetic pole pieces for rotation around a center axis provided by the axis,

said circumferential surface portion of said first cup shaped



member has formed at a free end thereof a plurality of first projections each of which is formed as an extension extending in the direction of the axis in an integral relationship from said circumferential surface portion and has a pair of opposite side edges extending parallel to the axis, a plurality of end edge portions which extend in a plane perpendicular to the axis between said first projections, and a plurality of first recesses which are opened to said end edge portions between said first projections and each of which has a pair of opposite side edges extending parallel to the axis,

said circumferential surface portion of said second cup shaped member has formed at a free end thereof a plurality of second projections each of which is formed as an extension extending in the direction of the axis in an integral relationship from said circumferential surface portion and has a pair of opposite side edges extending parallel to the axis, said second projections being adapted to be fitted in said first recesses of said first cup shaped member, a plurality of end edge portions which extend in a plane perpendicular to the axis between said second projections, and a plurality of second recesses which are opened to said end edge portions between said second projections and each has a pair of opposite side edges extending parallel to the axis, said second recesses being adapted to receive said first projections of said first cup shaped member therein,

said first magnetic pole plate is formed so that said outer circumferential edge of said plate-formed portion thereof has an outer diameter substantially equal to or smaller than the outer diameter of said circumferential surface portion of said second cup shaped member and has formed therein a plurality of first additional recesses each of which has a pair of opposite side edges for engaging with the opposite side edges of a corresponding one of said first projections of said first cup shaped member to receive the first projection therein, and a plurality of second additional recesses at least one of which has a pair of opposite side edges for closely engaging with the opposite side edges of a corresponding one of said second projections of said second cup shaped member by mutual interference to receive the second projection therein by force fitting, and wherein

said second magnetic pole plate is formed so that said outer circumferential edge of said plate-formed portion thereof has an outer diameter substantially equal to or slightly greater than the outer diameter of said circumferential surface portion of said first cup shaped member and has formed therein a plurality of third additional recesses each of which has a pair of opposite side edges for engaging with the opposite side edges of a corresponding one of said second projections of said second cup shaped member to receive the second projection therein, and a plurality of fourth additional recesses at least one of which has a pair of opposite side edges for closely engaging with the opposite side edges of a corresponding one of said first projections of said first cup shaped member by mutual interference to receive the first projection therein by force fitting.

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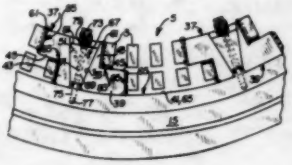
**4,942,326**

## BIASED SECUREMENT SYSTEM FOR END WINDING CONDUCTOR

**John M. Butler, III, Orlando, and Hector O. Ponce, Pensacola, both of Fla., assignors to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Apr. 19, 1989, Ser. No. 340,196**
**Int. Cl.[5] H02K *3/46, 3/00***
**U.S. Cl. 310—260** **11 Claims**



9. A biased securement system for end winding conductors of an electromechanical apparatus comprising:

a support ring disposed about a plurality of peripherally spaced said end windings, said support ring having an inner surface and a threaded bore; and

a biased wedge system located between said spaced end windings to compress said end windings in both a radial and circumferential direction;

said biased wedge system including:

a pair of confronting spacer blocks trapezoidal in shape and flush with said inner surface of said support ring, said spacer blocks having confronting angular surfaces which converge in the direction of said support ring;

a triangular shaped wedge slideably engageable with said confronting angular surfaces and disposed between said pair of spacer blocks to bias the same in a circumferential direction, said wedge having a passageway therethrough;

a bolt extending through said passageway and threadedly engaged in said threaded bore and having a head; and

a belleville spring washer disposed between said head and said wedge to bias said wedge towards said support ring.

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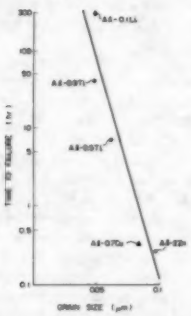
4,942,327

## SOLID STATE ELECTRONIC DEVICE

Hitoshi Watanabe; Norio Hosaka, both of Yokohama; Akitsuna Yuhara, Kawasaki, and Jun Yamada, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed May 26, 1989, Ser. No. 357,464
Claims priority, application Japan, Jun. 1, 1988, 63-132686
Int. Cl.[5] H01L *41/08*
U.S. Cl. 310—313 R 8 Claims




1. A solid state electronic device comprising:

a substrate along which a surface acoustic wave propagates, and

a conductive thin film provided on the surface of said substrate, said conductive thin film constituting at least one of electrodes, electric wiring patterns and bonding pads, wherein at least a part of said conductive thin film is made of a first aluminum alloy added with lithium by 0.05–3 wt %.

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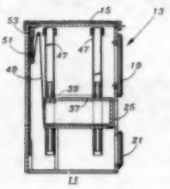
4,942,328

## CABINET WITH ELEVATING SHELF

Richard Price, 24529 Los Alisos #293, Laguna Hills, Calif. 92653

Filed Mar. 31, 1989, Ser. No. 332,236
Int. Cl.[5] A47B *57/00*
U.S. Cl. 312—306 11 Claims



1. A cabinet for retractably storing audio/video equipment comprising:

a main body;

a flip up/slide in top door adapted to rotate from a horizontal to a vertical position and thereafter descend vertically within the main body;

a support shelf disposed within the main body and adapted to slideably vertically traverse within the main body; and

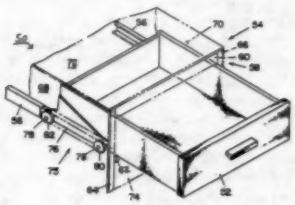
connecting means for elevating the support shelf when the top door vertically descends within the main body.

4,942,329

## CANTILEVERED DRAWER SLIDE ARRANGEMENT

Gary W. Nelson, 22933 Hatteras St., Woodland Hills, Calif. 91367

Continuation of Ser. No. 882,826, Jul. 7, 1986, Pat. No. 4,732,436, which is a continuation of Ser. No. 533,996, Sep. 20, 1983, Pat. No. 4,615,572. This application Mar. 7, 1988, Ser. No. 165,150
The portion of the term of this patent subsequent to Oct. 7, 2003, has been disclaimed.
Int. Cl.[5] A47B *88/00*
U.S. Cl. 312—341.1 16 Claims



1. A simplified drawer guide system in combination with a drawer and cabinet comprising

a pair of metal tracks, respectively mounted rigidly to the cabinet at opposite sides of the drawer and extending forwardly and rearwardly, the drawer having upright front, rear and left and right side walls defining a storage space, and the drawer being movable forwardly and rearwardly in a length direction of travel,

left and right metal brackets attached to the outermost surfaces of the left and right side walls of the drawer, at the rear third of the drawer, each bracket having a plate carrying rollers independently of said drawer side walls, wit the rollers spaced in cantilevered and sidewardly offset relation to the plate and to the drawer,

the rollers associated with each bracket being linearly spaced in said length direction and mounted onto one of the tracks for supporting the drawer rearward extent for forward and rearward drawer travel at the same level relative to the cabinet, and throughout drawer travel relative to the cabinet, the linearly spaced rollers, the brackets and tracks being everywhere confined rearwardly of an upright plane defined by the front of the cabinet when the bulk of the drawer is pulled forwardly to project at the front side of said plane,

there being means provided between at least one bracket and at least one track for allowing relative lateral movement between the one bracket and at least one track.

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4,942,330

## LAMP ASSEMBLY UTILIZING SHIELD AND CERAMIC FIBER MESH FOR CONTAINMENT

Robert J. Karlotski, Weare, N.H.; Thomas J. Sentementes, Wakefield, Mass., and Roger A. Johnson, Grafton, N.H., assignors to GTE Products Corporation, Danvers, Mass.

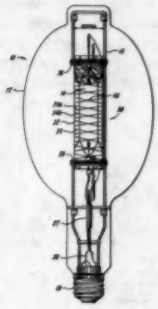
Filed Sep. 30, 1988, Ser. No. 252,090
Int. Cl.[5] H01J *61/34*
U.S. Cl. 313—25 18 Claims

1. A double-enveloped lamp assembly comprising:

a light-source capsule subject to burst on rare occasions;

containment means for absorbing and dissipating a portion of the energy when said light-source capsule bursts, said containment means comprising a light-transmissive shield substantially surrounding said light-source capsule and a mesh disposed on an outer surface of said shield for reinforcing said shield, said mesh being fabricated of substantially nonconducting ceramic fibers which can withstand the operating temperature of said light-source capsule

over extended operating times, said ceramic fibers having sufficient strength to reinforce said shield and having a sufficiently small diameter to limit blockage of light emitted by said light-source capsule;



a light-transmissive outer envelope, said light-source capsule, said light-transmissive shield and said mesh being mounted within said outer envelope; and

means for coupling electrical energy to said light-source capsule.

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**4,942,331**

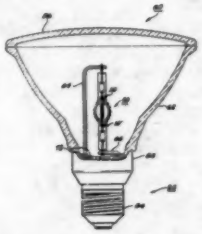
**FILAMENT ALIGNMENT SPUD FOR INCANDESCENT LAMPS**

**Rolf S. Bergman, Cleveland Heights, and William O. Harris, E. Cleveland, both of Ohio, assignors to General Electric Company, Schenectady, N.Y.**

**Filed May 9, 1989, Ser. No. 349,282**

**Int. Cl.[5] H01K *1/18, 1/40***

**U.S. Cl. 313—271** **15 Claims**



15. A double ended tungsten halogen lamp comprising a vitreous, light transmissive envelope having a mid portion of a predetermined generally spherical or elliptical shape as a filament chamber coated with an infrared reflecting and a visible light transmitting coating and enclosing a filament and one or more halogen compounds and inert gas within, said envelope terminating at each end in a tubular portion, with said filament being radially aligned in said chamber along the optical center thereof and being attached to and supported at each end by a spud located in each of said two tubular portions, said spud made of refractory metal wire in the shape of a ring having at least one turn and with a loop on each side of said ring having a diameter smaller than that of said ring and which extend towards the center thereof, with a leg extending out from the end of each of said loops away from each other and being generally perpendicular to the plane of the ring and coaxial with respect to the center thereof with one of each of said legs welded to a respective end of said filament and the other of each of said legs being at least a portion of an inlead.

**4,942,332**

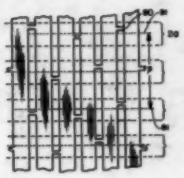
**TIED SLIT MASK FOR COLOR CATHODE RAY TUBES**

**Robert Adler, Northfield; John H. Coult, and Paul Strauss, both of Chicago, all of Ill., assignors to Zenith Electronics Corporation, Glenview, Ill.**

**Filed Dec. 2, 1988, Ser. No. 279,180**

**Int. Cl.[5] H01J *29/07***

**U.S. Cl. 313—402** **10 Claims**



1. A front assembly for a color cathode ray tube including a glass faceplate having on its inner surface a centrally disposed phosphor screen, and a slit-type metal foil shadow mask mounted in tension on a mask-support structure located on opposed sides of said screen, said mask comprising a series of parallel strips separated by slits, the strips being loosely coupled by widely spaced ties, the wide tie spacing being such as to produce a strip coupling which promotes handleability of the mask during mask and tube fabrication and facilitates damping of strip vibration when mounted in a tube, but which is insufficient to induce unacceptable Poisson contraction of the mask when uniaxially tensed along the direction of the strips in the plane of the mask, or to permit an unacceptable thermal expansion perpendicular to and in the plane of said strips.

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**4,942,333**

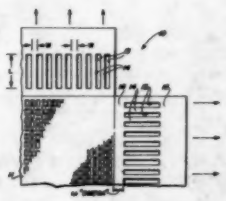
**SHADOW MASK WITH BORDER PATTERN**

**Lawrence D. Knox, Milford, Mass., assignor to North American Philips Corporation, New York, N.Y.**

**Filed Dec. 5, 1988, Ser. No. 279,889**

**Int. Cl.[5] H01J *29/07***

**U.S. Cl. 313—402** **6 Claims**



1. A shadow mask adapted for tensioned mounting in a flat faced color CRT, the mask comprising a central apertured viewing area and a surrounding border region, the border region comprising mounting strips connected to the viewing area by a plurality of legs, the legs mutually parallel and orthogonal to an adjacent edge of the viewing area, the border regions being relatively stiff in tension and relatively flexible in transverse bending.

## 4,942,334
## ELECTRON-GUN SYSTEM

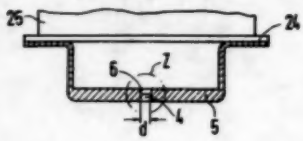
**Helmut Kimmel, Esslingen, and Hans Reule, Wendlingen, both of Fed. Rep. of Germany, assignors to Nokia Graetz, Pforzheim, Fed. Rep. of Germany**

**Filed May 31, 1988, Ser. No. 200,606**

**Claims priority, application Fed. Rep. of Germany, Jun. 5, 1987, 3718838**

**Int. Cl.[5] H01J *29/51***

**U.S. Cl. 313—414** **6 Claims**




6. Electron-gun system for cathode-ray tubes comprising at least one cathode and at least three electrodes, the second of which is a screen grid, which are arranged one behind the other and have apertures defined by cylindrical surfaces through each of which an electron beam can pass, characterized in that the aperture (4) in the screen grid (24) has a conical widening defined by a conical surface contiguous with the cylindrical surface on its side facing the third electrode (25), whereby current transfer into the screen grid and the third electrode is greatly reduced.

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## 4,942,335
## BLUE-LUMINESCING LANTHANUM-GADOLINIUM-OXYBROMIDE, LUMINESCENT SCREEN COMPRISING SUCH AN OXYBROMIDE AND CATHODE RAY TUBE PROVIDED WITH SUCH A SCREEN

**Cornelis A. H. A. Mutsaers; Dagobert M. De Leeuw; Dirk B. M. Klaassen, and Cornelis R. Ronda, all of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Feb. 2, 1989, Ser. No. 305,879**

**Claims priority, application Netherlands, Feb. 3, 1988, 8800254**

**Int. Cl.[5] C09K *11/86***

**U.S. Cl. 313—468** **14 Claims**

1. A blue-luminescing lanthanum-gadolinium-oxybromide, activated by trivalent cerium, characterized in that the oxybromide is also activated by trivalent terbium and is defined by the molecular formula

ti $La_{1-x-y-z}Gd_xCe_yTb_zOBr$,

in which

$0.25 \leqq x \leqq 1-y-z$,

$0.002 \leqq y \leqq 0.05$,

$0.0001 \leqq z \leqq 0.005$ and $y > z$ and exhibits a higher energy efficiency upon cathode ray excitation than said oxybromide absent Tb.

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## 4,942,336
## TRAVELING-WAVE TUBE WITH CONFINED-FLOW PERIODIC PERMANENT MAGNET FOCUSING

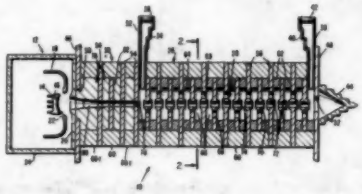
**Kurt Amboss, 751 Haverford Ave., Pacific Palisades, Calif. 90272, and Jon A. Davis, 6842 Verde Ridge Rd., Rancho Palos Verdes, Calif. 90274**

**Filed Apr. 18, 1988, Ser. No. 182,632**

**Int. Cl.[5] H01J *25/42***

**U.S. Cl. 315—3.5** **18 Claims**

13. In a traveling-wave tube including (a) electron gun means having a cathode for generating a stream of electrons along a predetermined axial path, (b) collector means disposed at an end of said path remote from said electron gun means for collecting electrons of said stream, (c) a gun ferromagnetic pole piece disposed along said path adjacent to said electron gun means, a collector ferromagnetic pole piece disposed along said path adjacent to said collector means, and a plurality of intermediate ferromagnetic pole pieces disposed at respective spaced locations along said path between said gun and collector pole pieces, said gun, collector and intermediate pole pieces having respective aligned apertures along said path to provide a passage for said stream of electrons, (d) a series of permanent magnets respectively interposed between and abutting adjacent ones of said pole pieces with like poles of adjacent magnets confronting one another, and (e) slow-wave



structure means disposed along and surrounding said path and adjacent to at least a portion of said series of magnets for propagating electromagnetic wave energy in such manner that said electromagnetic wave energy can interact with said stream of electrons, the improvement in eliminating field reversal at the cathode, in which:

a first or a third one of said magnets located adjacent from said gun pole piece has an axial thickness which is different from an axial thickness associated with the remainder of said magnets for providing a scalar magnetic potential of essentially zero on said gun pole piece, thereby eliminating the field reversal at the cathode.

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## 4,942,337
## SPARK GAP APPARATUS TRIGGERABLE BY MICROWAVE PULSE

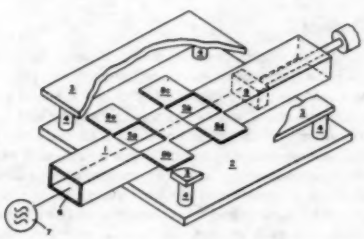
**Hans Beerwald, Kalkgasse 2, 5370 Kall-Sistig, Fed. Rep. of Germany, and Günter Bohm, Potthofstr. 30, 5840 Witten, Fed. Rep. of Germany**

**Filed Jun. 20, 1988, Ser. No. 209,110**

**Claims priority, application Fed. Rep. of Germany, Jun. 25, 1987, 3721007; Dec. 23, 1987, 3743756**

**Int. Cl.[5] H01J *25/34***

**U.S. Cl. 315—39** **10 Claims**



10. A method of providing a high current pulse to a load using triggerable spark gap apparatus including a first electrode comprising a microwave waveguide and a second electrode spaced from said waveguide with said first and second electrodes comprising means for causing the simultaneous existence of a plurality of spark channels therebetween in

response to coupling of a microwave pulse to said waveguide, said method comprising the following steps:

(a) connecting said electrodes in a circuit with a power source and a load so that triggering of said electrodes causes a high current pulse from said power source to be applied to said load; and

(b) applying to said waveguide a microwave pulse of sufficient energy to cause said plurality of spark channels without regard to the voltage level of said power source.

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**4,942,338**

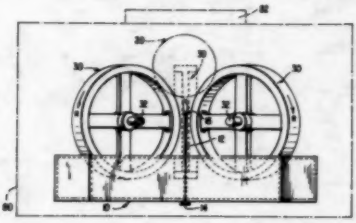
## METHOD AND APPARATUS FOR PLASMA CONTAINMENT

**Sam Bida, Ely, Nev., assignor to Sam Bida, Ely, Nev.**

**Filed Mar. 21, 1988, Ser. No. 171,437**

**Int. Cl.[5] H05H *1/04***

**U.S. Cl. 315—111.71** **18 Claims**



1. The method of containing a body of ionized plasma having an oscillating magnetic field, comprising

positioning a plurality of articles of high permeability material adjacent to said plasma, said high permeability material being substantially non-magnetic per se and not adapted to generate a substantial magnetic field independently of said plasma, and

maintaining said articles in position relative to said plasma to produce forces of magnetic attraction between said high permeability material and said plasma and thereby retain said plasma relative to said articles without the application of an extraneous magnetic field.

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**4,942,339**

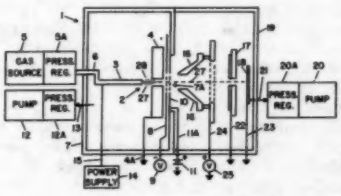
## INTENSE STEADY STATE ELECTRON BEAM GENERATOR

**Ady Hershcovitch, Mount Sinai; Vincent J. Kovarik, Bohemia, and Krsto Prelec, Setauket, all of N.Y., assignors to The United States of America as represented by the United States Department of Energy, Washington, D.C.**

**Filed Sep. 27, 1988, Ser. No. 249,813**

**Int. Cl.[5] H01J *29/00***

**U.S. Cl. 315—111.81** **15 Claims**




1. An intense, steady state, low emittance electron beam generator comprising a hollow cathode discharge plasma source consisting of a cathode, an anode mounted in spaced relationship to the cathode, a housing surrounding the cathode and anode, pressure regulating means for controlling the ambient pressure between the cathode and anode, power supply means for establishing a discharge voltage between the cathode and anode to generate a plasma source that is operable at a cathode temperature in the range of about 1300° C. to 2500° C. and at an electric potential in the range of −30 volts to −80 volts, thereby to simultaneously produce bulk electrons and fast primary electrons, said fast primary electrons being made to have an energy that is about equal to that of the cathode potential and to have a thermal spread that is close to that of the cathode temperature and within the range of about 0.1 to 0.4 eV, and a pressure regulating means operably connected to supply a preselected gas to the cathode from a source of gas, and further gas pressure regulating means operably connected to maintain the ambient gas pressure between the cathode and anode in a range of about $1.85\times10^{-5}$ torr, in combination with an extraction electrode means that is spaced from the plasma source for extracting a beam of said fast primary electrons from the plasma source and for directing the electron beam toward a target, said target being mounted in spaced relationship to the plasma source, and a second housing disposed around the extraction electrode and target, a pump operably connected to maintain a predetermined pressure within said second housing, and a bulk electron repelling grid operably positioned serially between the plasma source and said extraction electrode means, said grid being operably connected to a source of voltage that is effective to negatively bias the grid to a predetermined negative voltage that causes the grid to repel said bulk electrons away from the target while allowing the fast primary electrons from said plasma source to pass through the grid and move toward the target in a beam having a current in excess of 500 milliamperes, said beam being comprised primarily of fast primary electrons.

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**4,942,340**

## ARRANGEMENT FOR DISPLAYING OPERATION OF BOOSTER CIRCUIT FOR FLASH DEVICE CAMERA

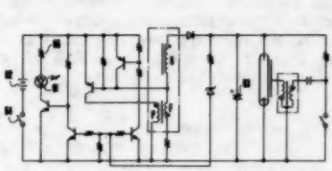
**Kazuo Ikawa, Kanagawa, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Continuation of Ser. No. 790,081, Oct. 22, 1985, abandoned. This application Dec. 12, 1988, Ser. No. 284,762**

**Claims priority, application Japan, Oct. 23, 1984, 59-223711; Feb. 12, 1985, 60-025892; May 14, 1985, 60-102438**

**Int. Cl.[5] H05B *41/32***

**U.S. Cl. 315—241 P** **3 Claims**



1. A booster circuit operation display arrangement in a flash device for a camera, comprising:

(a) an oscillating booster circuit including a boosting oscillation transformer having a secondary winding;

(b) flash means connected to said oscillating booster circuit for receiving a forward current therefrom for flashing;

(c) a display circuit arranged to be operated by a spike voltage of said oscillating booster circuit, said display circuit being connected to an intermediate point of the secondary winding of said boosting oscillation transformer;

(d) mono-directional current passing means connected in series with said display circuit in such a direction that a forward current of said oscillating booster circuit does not enter said display circuits; and

(e) a charging circuit connected in parallel with said display circuit.

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**4,942,341**

## VERTICAL RAMP GENERATOR

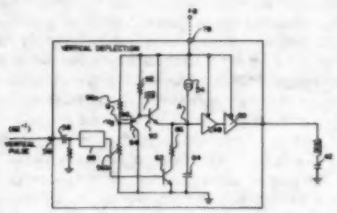
**Norio Imaizumi, Ota, Japan, assignor to Sanyo Electric Co., Ltd., Moriguchi, Japan**

**Filed Jun. 9, 1989, Ser. No. 363,830**

**Claims priority, application Japan, Jun. 20, 1988, 63-151767**

**Int. Cl.[5] H01J** *29/70, 29/76*

**U.S. Cl. 315—403** **4 Claims**



1. A vertical ramp generator of a vertical deflection circuit for feeding a sawtooth wave current to a vertical deflection coil corresponding to a vertical pulse, said vertical ramp generator comprising:

a waveform shaping circuit triggered corresponding to said vertical pulse and generating a pulse of a predetermined width;

constant current circuit generating a constant current;

a capacitor charged corresponding to currents from said constant current circuit;

control transistor controlling charge and discharge of said capacitor corresponding to an output signal from said waveform shaping circuits; and

a clamping circuit, wherein said clamping circuit comprises voltage dividing means for dividing a supply voltage by resistances, and

a transistor, a base of said transistor is applied with output voltage from said voltage dividing means and an emitter of said transistor is connected to a terminal of said capacitor,

wherein when terminal voltages of said capacitor fall or rise to a predetermined value, said clamping circuit prevents the terminal voltage from falling or rising from said predetermined value and said clamping circuit varies the predetermined voltage value of each of said circuits corresponding to a supply voltage.

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**4,942,342**

## PARALLEL SWEEPING SYSTEM FOR ELECTROSTATIC SWEEPING ION IMPLANTER

**Osamu Tsukakoshi, Hiratsuka, Japan, assignor to Nihon Shinku Gijutsu Kabushiki Kaisha, Chigasaki, Japan**

**Filed Sep. 12, 1988, Ser. No. 243,614**

**Claims priority, application Japan, Sep. 30, 1987, 62-243690; Jun. 20, 1988, 63-150075**

**Int. Cl.[5] H01J** *29/74*

**U.S. Cl. 315—410** **4 Claims**

1. A parallel sweeping system for electrostatic sweeping ion implanters, comprising:

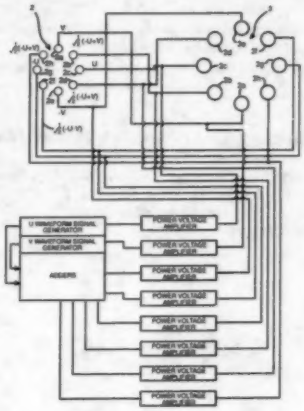
(a) an ion source for generating charged ion beams,

(b) a first electrostatic deflector comprising a plurality of more than four electrodes equally spaced around an optical axis,

(c) a second electrostatic deflector comprising the same plurality of electrodes also equally spaced around said optical axis and axially spaced from said first deflector.

(d) means for electrically connecting pairs of said electrodes, one on said first deflector to the one on the opposite side of said axis of said second deflector,

(e) means for applying different predetermined voltages to each connected pair of electrodes, and



(f) a target wafer to be raster-scanned by said ion beams with exact parallelism to said optical axis.

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**4,942,343**

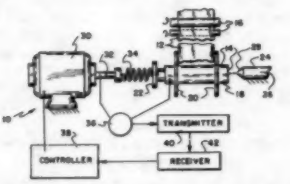
## TORQUE MEASURING AND TRANSMITTING SYSTEM FOR A WEB SPOOLING MECHANISM

**David M. Orlicki, Rochester; Bruce E. Koppe, Caledonia, and Thomas W. Palone, Rochester, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 11, 1988, Ser. No. 231,302**

**Int. Cl.[5] B65H** *77/00*

**U.S. Cl. 318—6** **6 Claims**




1. In a system for controlling the tension in a web as it is being wound onto a spool, the system having a chuck for rotating the spool to wind the web onto the spool and a motor having a shaft for driving the chuck, the web being subjected to changes in tension as it is wound onto the spool with such tension changes subjecting the chuck to a variable load related to the change in web tension, the improvement comprising:

a spring coupling the shaft to the chuck for effecting rotation of the chuck by the shaft, the spring enabling the chuck to move relative to the shaft in response to the variable load related to web tension while isolating the chuck from the inertia of the motor,

an angle transducer coupled to the motor shaft and the chuck for detecting the instantaneous relative positions of the shaft and the chuck and for providing an output signal indicative of such relative positions, and

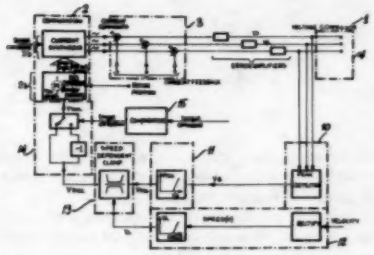
a motor controller for receiving a signal from the transducer and controlling the motor in response to the signal so that the torque applied by the motor shaft to the spring for driving the chuck varies in response to changes in the tension in the web as it is wound onto the spool.

4,942,344

## CONTROL SYSTEM FOR BRUSHLESS MOTORS

Francis E. Devitt; John P. Doran, both of Carrigaline, and Kevin J. Gaughan, Rochestown Road, all of Ireland, assignors to Moog Ltd., Ringaskiddy, Ireland

Filed May 2, 1988, Ser. No. 189,039
Claims priority, application Ireland, Apr. 30, 1987, 1115/87
Int. Cl.[5] H02P 6/02
U.S. Cl. 318—254 8 Claims



6. In combination with a brushless motor incorporating a stator, stator windings and a rotor, a control apparatus comprising:

a voltage supply for the stator windings;

means for indicating motor torque demand;

means for indicating motor rotor position;

monitoring means for continuously monitoring a voltage level of the stator windings;

comparing means for continuously comparing said stator winding voltage level with a predetermined maximum value of stator winding voltage level corresponding to full utilization of said stator winding voltage supply;

a commutation circuit for outputting a motor current demand signal in response to the indications of motor torque demand and rotor position, said commutation circuit having means for shifting a torque-angle of said motor current demand signal in response to said comparison between said stator winding voltage level and said maximum value of stator winding voltage level corresponding to full utilization of the stator winding voltage supply; and

a current feedback circuit for outputting a voltage command signal for the stator windings in response to said motor current demand signal and current feedback from the stator windings.

7. A method of controlling torque-angle shift in a brushless motor having a stator, stator windings and a rotor, the method comprising the steps of:

continuously monitoring a stator winding voltage command signal representing a voltage level of the stator windings;

continuously monitoring motor torque direction;

providing a predetermined maximum value of said stator winding voltage command signal corresponding to full utilization of a voltage supply for the stator windings;

continuously comparing said stator winding voltage command signal with said predetermined maximum value of stator winding voltage command signal;

controlling a shift of torque-angle of a current demand signal for said stator windings at an amount determined by said comparison; and

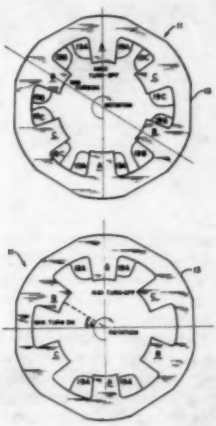
changing the polarity of said torque-angle shift of said current demand signal when the monitored torque direction changes.

4,942,345

## POLE CHANGING SWITCHED RELUCTANCE MOTOR AND METHOD

Gary E. Horst, St. Louis County, Mo., assignor to Emerson Electric Co., St. Louis, Mo.

Filed Feb. 14, 1989, Ser. No. 310,739
Int. Cl.[5] H02K 37/00
U.S. Cl. 318—254 9 Claims



1. A switched reluctance motor comprising:

a stator having a plurality of salient stator poles disposed around a central bore;

a rotor disposed for rotation in the central bore of the stator, said rotor having a plurality of salient poles;

said plurality of salient stator poles being divided into at least three phases, each phase having associated therewith separate, independently switchable phase windings wound around the stator poles of that phase;

first switch means for controlling application of power to the windings of the first phase;

second switch means for controlling application of power to the windings of the second phase;

third switch means for controlling application of power to the windings of the third phase; and

control means for governing the operation of the first, second and third switch means;

said control means during low speed operation governing each of the first, second and third switch means to apply power to the corresponding phase windings from a selected turn-on angle to a selected turn-off angle, the maximum difference during low speed operation between the turn-on angle and the turn-off angle for each phase being no greater than the angle subtended by adjacent stator poles as measured from the geometric center of the stator;

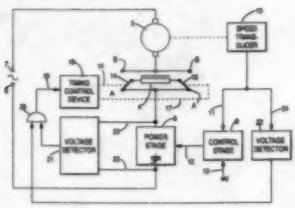
said control means during high speed operation governing the switch means so that only the phase windings of the first phase are energized, the difference between the turn-on angle and the turn-off angle for the first phase windings during high speed operation being greater than the angle subtended by adjacent stator poles.

4,942,346

## CIRCUIT FOR CONTROLLING ROTATIONAL DIRECTION AND ROTATIONAL SPEED OF AN ELECTRIC MOTOR

Giuseppe Ardit, Venice; Fiorenzo Cigana, San Dona di Piave, and Renzo Magris, Pordenone, all of Italy, assignors to Procond Elettronica S.p.A., Pordenone, Italy

Filed Jun. 22, 1989, Ser. No. 370,043
Claims priority, application Italy, Jul. 7, 1988, 45743 A/88
Int. Cl.[5] H02F *1/00*
U.S. Cl. 318—280 15 Claims



1. A control circuit for controlling a rotational direction and a rotational speed of an electric motor driven by a power source having first and second terminals, particularly an electric motor having a field winding portion having first and second terminals and an armature portion operatively connected to a speed transducer which outputs a rotational speed signal having a value proportional to the rotational speed of the motor, said control circuit comprising:

switching means for selectively electrically connecting the electric motor to the power source and for establishing the rotational direction of the electric motor;

control means, serially connected to said switching means, for establishing a voltage level applied to the electric motor in accordance with a value of a control signal input thereto;

control signal generating means, connected to said control means and having means for connection to the speed transducer, for establishing the value of the control signal in accordance with a predetermined voltage level and the rotational speed signal output by the speed transducer, and for outputting the control signal to the control means;

timing control means, connected to said switching means and said control means and said control signal generating means, for causing said switching means to establish the rotational direction of the electric motor in accordance with a received rotational direction signal, and for identifying a failure according to at least one of said control means and said control signal generating means, and for causing said switching means to electrically disconnect the electric motor from the power source upon identifying a failure according to at least one of said means and said control signal generating means.

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4,942,347

## MOTOR DRIVE CIRCUIT

Kenji Ohtani, and Yorinobu Murayama, both of Kyoto, Japan, assignors to Rohm Co., Ltd., Japan

Filed Nov. 16, 1989, Ser. No. 437,225
Claims priority, application Japan, Nov. 16, 1988, 63-289247; Nov. 26, 1988, 63-298481; Nov. 26, 1988, 63-298482
Int. Cl.[5] H02P *7/06*
U.S. Cl. 318—434 9 Claims

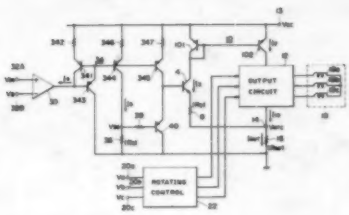
1. In a motor drive circuit incorporating an output circuit for supplying a drive output to a motor, the improvement characterized by comprising:

a differential amplifier for generating a current corresponding to a servo signal;

a first current mirror circuit responsive to said current obtained by said differential amplifier;

a current-voltage converting means for converting a current flowing through said first current mirror circuit;

a buffer circuit for permitting passage of a voltage obtained by said current-voltage converting means;



a first transistor having bias set by said voltage acquired by said buffer circuit and responsive to said current from said first current mirror circuit; and

a second current mirror circuit for supplying a drive output, obtained by said first transistor, to said output circuit.

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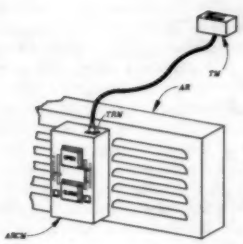
4,942,348

## ELECTRONIC AIR REGISTER CONTROLLER

Ole K. Nilssen, Caesar Dr., Rte. 5, Barrington, Ill. 60010

Continuation-in-part of Ser. No. 17,084, Feb. 20, 1987, Pat. No. 4,835,413. This application Mar. 8, 1989, Ser. No. 320,503
Int. Cl.[5] G05D *23/00*
U.S. Cl. 318—468 23 Claims



1. In a home or office having a forced air heating/cooling system with an air duct, the improvement comprising:

air flow control means mounted in relationship with the air duct and operative to control the flow of air therethrough; the air flow control means comprising: (i) electric motor means operatively connected with an air damper means; (ii) electric energy means connected with the electric motor means and operative in response to control actions provided at a control input to provide electric power thereto, thereby to permit control of the air damper means without requiring connection with an external source of electric power, such as an electric utility power line; and (iii) control action means connected with the control input and operative to provide said control actions;

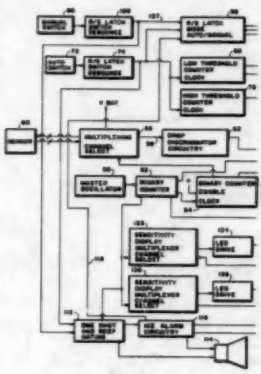
whereby the air flow control means is operable to control the flow of air through the air duct in response to the control actions provided by the control action means, yet without having any electrical connection with a power source external of the air flow control means.

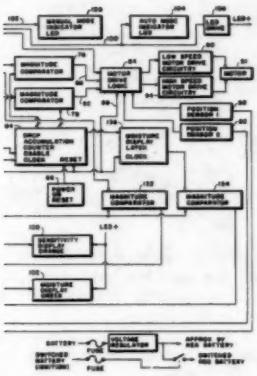
## 4,942,349

### CONTROL SYSTEM FOR OPERATING A WINDOW WIPER IN RESPONSE TO WATER MOISTURE

Donald L. Millerd, 850 Plaza Toluca, San Diego, Calif. 92114; Marl J. Bell, 29852 Quail Hollow La., Valley Center, Calif. 92082, and Robert S. Alpert, 2227 Summerhill Dr., Encinitas, Calif. 00000

Filed Oct. 14, 1988, Ser. No. 258,159
Int. Cl.[5] H02P 3/00
U.S. Cl. 318—483 13 Claims





1. An automatic control system for operating an electrically actuated device in response to the presence of water moisture, said control system comprising, in combination:

(a) a voltage source;

(b) a moisture sensor comprising a plurality of spaced apart, exposed conductive strips;

(c) current detection means, having at least one input and at least one output, for producing a signal at an output when the current flow at an input exceeds a first prescribed threshold;

(d) first means for connecting a first plurality of said conductive strips to said voltage source;

(e) second means for connecting a second plurality of said conductive strips to said current detection means, each one of said second plurality being adjacent one of said first plurality of strips thereby defining adjacent pairs of sensor strips;

(f) means, coupled to said current detection means, for switching on said device when the number of pairs of adjacent sensor strips, for which the current flow through each respective pair exceeds said first prescribed threshold, exceeds a second prescribed threshold;

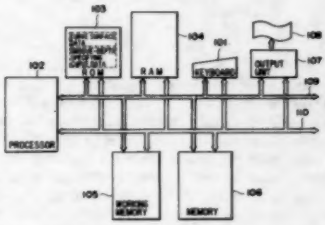
whereby a determination is made by said control system to operate said device, or to terminate its operation, in dependence upon the amount of moisture detected.

## 4,942,350

### METHOD OF CREATING NC DATA FOR GROOVING

Masaki Seki, 3-15-2-406, Takaido-nishi, Suginami-ku, Tokyo 168; Koji Samukawa, and Osamu Hanaoka, both of Fanuc Dai-3 Virakaramatsu, 3527-1, Shibokusa, Oshino-mura, Minamitsuru-gun, Yamanashi 401-05, all of Japan

PCT No. PCT/JP88/00852, § 371 Date Apr. 10, 1989, § 102(e) Date Apr. 10, 1989, PCT Pub. No. WO89/02106, PCT Pub. Date Mar. 9, 1989
PCT Filed Aug. 26, 1988, Ser. No. 347,894
Claims priority, application Japan, Aug. 26, 1987, 62-212350
Int. Cl.[5] G05B 19/18
U.S. Cl. 318—569 5 Claims



1. A method of creating NC data for grooving a three-dimensional curved surface, comprising the steps of:

specifying a groove shape which lies on the three-dimensional curved surface;

specifying a groove-depth specifying curve defining a relationship between a distance dk measured from one end of said groove shape and a groove depth hk of a point at said distance dk;

obtaining said distance dk in accordance with

$$dk = lk \cdot Lj / Li$$

where Li represents a total length of said groove shape, lk represents a distance from said one end of said groove shape and Lj represents a total length of said groove-depth specifying curve;

obtaining, based on said groove-depth specifying curve, said groove depth hk at said distance dk; and

creating NC data for said grooving at said distance dk based on said groove depth identifying a groove depth of a point at the distance lk from said one end of said groove shape.

## 4,942,351

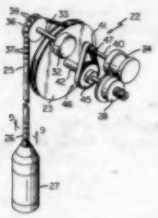
### SYSTEM FOR MONITORING A LEVEL OF MATERIAL, DEVICE THEREFOR AND METHODS OF MAKING THE SAME

Paul D. Kronau, Knoxville, Tenn., assignor to Robertshaw Controls Company, Richmond, Va.

Filed Mar. 28, 1989, Ser. No. 329,437
Int. Cl.[5] G01F 23/44
U.S. Cl. 318—642 4 Claims

1. In a system for monitoring a level of material held in a confining means, said system comprising a rotatable reel means, electrically operated motor means operatively interconnected to said reel means for causing rotation of said reel means in either direction of rotation thereof, a flexible support

means wound on said reel means and having a free end means, a probe means operatively interconnected to said free end means of said support means to be carried thereby, brake means operatively interconnected to said reel means for holding said reel means stationary when said brake means is in one condition thereof, and control means operatively interconnected to said motor means and said brake means for causing said brake means and said motor means to raise and lower said probe means by winding up said support means on said reel means and unwinding said support means from said reel means, the improvement wherein said motor means comprises an electrically operated stepper motor means, said control means



comprising microprocessor means, said flexible support means having conductor means carried thereby, said control means having means to operatively interconnect said conductor means to said microprocessor means, said probe means having means operatively interconnected to said conductor means to signal to said microprocessor means a relationship of said probe means relative to said level of said material in said confining means, said means of said probe means having first means to signal to said microprocessor means its relationship to a first level of said material and having a second means to signal to said microprocessor means its relationship to a second level of said material.

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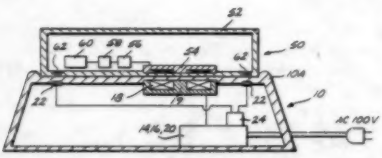
**4,942,352**

## NON-CONTACTING POWER SUPPLYING SYSTEM

**Shigeaki Sano, Fuchu, Japan, assignor to Toppan Moore Co., Ltd., Tokyo, Japan**

**Filed Sep. 9, 1988, Ser. No. 242,469**
**Int. Cl.[5] H02J 7/00**
**U.S. Cl. 320—2** **13 Claims**



**1.** A non-contacting power supplying system comprising:

a power supplying apparatus including a power supplying coil, signal supplying means for supplying a signal at a predetermined frequency, switch means responsive to an applied switching signal for interconnecting said signal supplying means with said power supplying coil to provide said signal at said predetermined frequency to said power supplying coil when said switching signal is supplied to said switch means, and a capacitor connected in parallel with said power supplying coil to establish resonance at a resonant frequency that is at least 1.5 times greater than said predetermined frequency, said power supplying apparatus further including switch control means responsive to a position detection signal for supplying said switching signal to said switch means;

a portable power receiving apparatus including a power receiving coil, said portable power receiving apparatus being positionable in a predetermined spatial relationship with said power supplying apparatus to electromagnetically couple said power receiving coil of said power receiving apparatus with power supplying coil of said power supplying apparatus; and

position detection means for supplying said position detection signal to said switch control means of said power supplying apparatus when said portable power receiving apparatus is in said predetermined spatial orientation with said power supplying apparatus.

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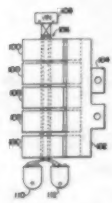
**4,942,353**

## HIGH FREQUENCY MATRIX TRANSFORMER POWER CONVERTER MODULE

**Edward Herbert, Canton; John D. Repp, Barkhamsted, and Stephen E. Cebry, Burlington, all of Conn., assignors to FMTT, Inc., Canton, Conn.**

**Filed Sep. 29, 1989, Ser. No. 415,043**
**Int. Cl.[5] H01F 33/00**
**U.S. Cl. 323—361** **12 Claims**



**1.** Matrix transformer converter module for use in a high frequency power converter, said module comprising,

at least one interdependent magnetic element defining a matrix transformer section;

means in each of said at least one interdependent magnetic elements defining at least one winding comprising an electrical conductor and having first and second ends, said at least one winding passing at least once through each of said at least one interdependent magnetic elements defining said matrix transformer section:

said means defining said at least one winding further means defining a passage for receiving a second electrical conductor having first and second ends to form at least one second winding:

inductor circuit means having two terminals, one of which terminals is coupled to said at least one winding and the other of which terminal is coupled to a output terminal defining a first voltage distribution bus whereby said inductor circuit means is in series between said at least one winding and said output terminal, and

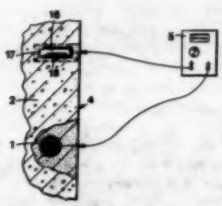
a second voltage distribution bus, said first and second distribution busses being physically and electrically separated from one another whereby a voltage potential is developed between said busses when an electrical conductor carrying an excitation signal is present to form said second winding.

4,942,354

## PROCESS FOR MONITORING THE EFFECTIVENESS OF REPAIRS MADE TO ZONES OF REINFORCED CONCRETE STRUCTURES

John B. Miller, Bergtunvn. 9B, N- 1084 Oslo 10, Norway

Continuation-in-part of Ser. No. 83,718, Aug. 10, 1987, abandoned. This application Jun. 16, 1989, Ser. No. 368,994
Claims priority, application Switzerland, Aug. 29, 1986, 3472/86
Int. Cl.[5] G01N 27/26
U.S. Cl. 324—71.2 1 Claim



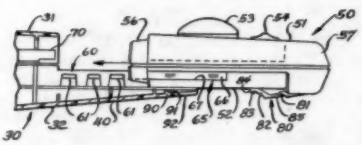
1. A process for continuously or intermittently monitoring the effectiveness of the repairs made to zones of reinforced concrete structures, which comprises implanting one or more lead reference electrodes (16) in the concrete (2) and connecting each of the said electrodes (16) to an instrument (5) for measuring electrical potential, the said instrument itself being connected to a metal strengthening element (1) embedded in the concrete (2).

4,942,356

## MODULAR ELECTRONIC DEVICE

David R. Ellingen, Kenosha; Steven E. Michalski, Franklin; Daniel Mieczkowski, and Larry D. Pacetti, both of Kenosha, all of Wis., assignors to Snap-on Tools Corporation, Kenosha, Wis.

Continuation of Ser. No. 189,477, May 12, 1988, abandoned. This application Jun. 26, 1989, Ser. No. 372,228
Int. Cl.[5] G01R 1/04
U.S. Cl. 324—156 23 Claims



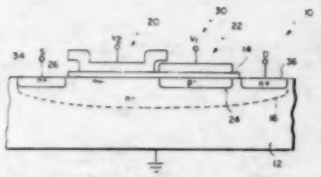
1. A modular electronic device comprising a main unit, at least one plug-in module adapted to be removably slid on to and mounted on said main unit, first and second interfitting electrical connectors respectively on said main unit and said module and automatically interfitting when said module is mounted on said main unit, said main unit being open at one end thereof such that said module is slid through said one end in a longitudinal direction, and first and second interfitting track structure respectively on said main unit and said module for guiding said module on and off of said main unit, said first and second interfitting track structure being constructed and arranged to prevent said module from being moved in a direction transverse to said longitudinal direction, said interfitting track structure including a groove.

4,942,357

## METHOD OF TESTING A CHARGE-COUPLED DEVICE

Win-Chyi Chang, Penfield, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.

Filed Aug. 7, 1989, Ser. No. 390,210
Int. Cl.[5] G01R 31/26; G11C 29/00
U.S. Cl. 324—158 R 12 Claims



1. A method of testing CCD's to detect the size of barriers and pockets therein, said method comprising the steps of:

test device which includes a forming a two-phase CCD and a transistor having an source and a drain, a buried channel in said device being common to said CCD and said transistor;

applying clock voltages to electrodes of said CCD to simulate the transfer of charge from one phase to another;

applying predetermined voltages to said transistor; and

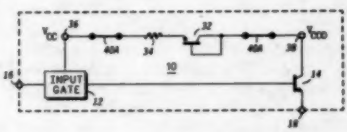
measuring a source voltage and a drain current for each of said predetermined voltages to determine values thereof which indicate the existence and extent of said barriers and pockets.

4,942,358

## INTEGRATED CIRCUIT OPTION IDENTIFICATION CIRCUIT AND METHOD

Gregory A. Davis, and Harold L. Spangler, both of Chandler, Ariz., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Nov. 2, 1988, Ser. No. 266,446
Int. Cl.[5] G06F 11/22; G01R 27/02
U.S. Cl. 324—158 R 5 Claims




1. A method for identifying at least two versions of integrated circuits each having the same functionality wherein the integrated circuits include two electrically isolated power supply conductors that are at substantially equal potential during normal operation of the integrated circuits, comprising the steps of:

disposing unilaterally current conducting circuit means in the respective versions of integrated circuits;

conductively coupling said conducting means between the two power supply conductors in all but one version of the integrated circuits;

raising the voltage potential at one of the two power supply conductors with respect to the other wherein current flows through said conducting means therebetween; and

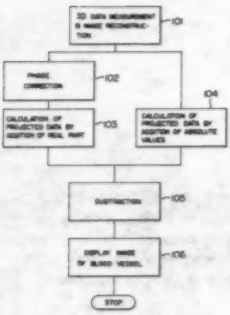
detecting said current flow through said conducting circuit means.

4,942,359

## METHOD OF MAGNETIC RESONANCE IMAGING

Koichi Sano, Sagamihara; Tetsuo Yokoyama, Tokyo, and Hideaki Koizumi, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Jan. 25, 1989, Ser. No. 301,901
Claims priority, application Japan, Jan. 29, 1988, 63-17078
Int. Cl.[5] G01R 33/20
U.S. Cl. 324—309 12 Claims




1. A method of magnetic resonance imaging comprising the steps of:

(a) applying a static magnetic field, gradient magnetic fields and a radio frequency magnetic field to a subject to be measured, and detecting nuclear magnetic resonance signals from the subject to be measured;

(b) reconstructing first image signal data by performing calculations using complex numbers indicative of the detected signals;

(c) obtaining first projection data by processing the first image signal data along a projection direction;

(d) calculating second image data by performing calculations using absolute values of the first image signal data;

(e) obtaining second projection data by processing the second image signal data along the projection direction; and

(f) obtaining image data of blood flow of the subject to be measured by performing subtraction between the first projection data and the second projection data.

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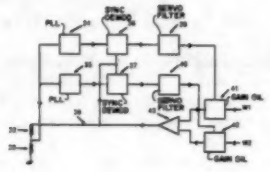
4,942,360

## A METHOD AND APPARATUS OF DISCRIMINATION DETECTION USING MULTIPLE FREQUENCIES TO DETERMINE A RECOGNIZABLE PROFILE OF AN UNDESIRABLE SUBSTANCE

Bruce H. Candy, Hunters Road, Basket Range, Australia (5138)

Filed Sep. 8, 1987, Ser. No. 93,837
Claims priority, application Australia, Sep. 8, 1986, PH7889
Int. Cl.[5] G01V 3/10
U.S. Cl. 324—329 18 Claims



1. A conducting metal discriminating detection apparatus comprising:

means to transmit at least two alternating magnetic fields of different frequency, each below 100 kHz,

means to receive respective signals arising from each of the transmitted frequencies being retransmitted from a target,

means for demodulating the respective received signals to determine a presence of at least one of reactive and/or resistive components;

means for comparing magnitudes of respective component levels at said different frequencies to produce an output signal indicative thereof an interpretable characteristic of which is substantially independent of a background environment which includes substantial material which has a substantial magnetic effect and has a reactive to resistive response ratio which is substantially independent of an interrogating frequency wherein said means for demodulating includes at least one synchronous demodulator for each transmitted signal component, synchronous demodulator references being derived from said transmitted signal components,

a low pass filter coupled to outputs of the synchronous demodulator, and wherein a low-passed output of each said demodulator is sensitive to one only of the transmitted frequencies, and each said synchronous demodulator having its reference selected whereby each said low-passed synchronously demodulated output includes information proportional to either predominantly reactive components of the magnetically interrogated environment at a frequency Wi, where i is the mathematical label of the i-th transmitted frequency (i=1,2,. . . ), to which the demodulator is sensitive, the output of such a demodulator's low-pass filter being called RCI the output of the reactive channel of Wi, or to predominantly resistive components of the magnetically interrogated environment at the frequency, Wi, to which the demodulator is sensitive, the output of such a demodulator's low-pass filter being called LCi, the output of the resistive channel of Wi, and further comprising

interpretive means including means adapted to compare by subtraction at least a selected ratio of one of the reactive channel's outputs with another to result in a difference signal called a reactive difference signal RDk, where k is the mathematical label of the Kth reactive difference signal (k=1, . . . ), such that RDk yields substantially no change when material that is substantially purely reactive and non-resistive below 100 kHz is moved within the influence of the transmitted fields and this occurs when the reactive channel gains are selected to be substantially equal.

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4,942,361

## METHOD AND APPARATUS FOR DETERMINING EARTH RESISTIVITIES IN THE PRESENCE OF EXTRANEOUS EARTH CURRENTS

William F. Gast, Dallas, and Charles F. Rhodes, Jr., Garland, both of Tex., assignors to Oryx Energy Company, Dallas, Tex.

Filed Jun. 7, 1988, Ser. No. 202,603
Int. Cl.[5] G01V 3/02
U.S. Cl. 324—360 13 Claims

1. Apparatus for measuring earth resistivity which comprises:

(a) means for providing square-wave direct current pulses,

(b) means for injecting said current pulses through at least one pair of electrodes into the earth,

(c) means for measuring the voltage of said pulses as received at electrodes in the earth at locations spaced apart from the location of electrodes for the injection of said current,

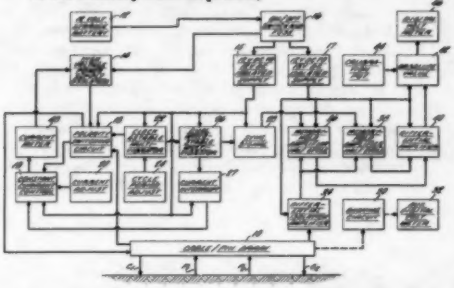
(d) means for amplifying said measured voltage received at the electrodes,

(e) two memory-hold amplifiers to receive said amplified pulses,

(f) means for providing synchronizing of the pulses to said memory-hold amplifiers and for providing sample and

hold signals to said amplifiers, whereby analog information concerning said amplified voltage is stored for one half-cycle in one of said amplifiers and for the remaining half-cycle in the other of said amplifiers,

(g) means for amplifying the difference between the output of the memory-hold amplifiers,



(h) an absolute value circuit for providing positive output regardless of the input polarity from the differential amplifier, and

(i) voltmeter means for displaying potential between electrodes,

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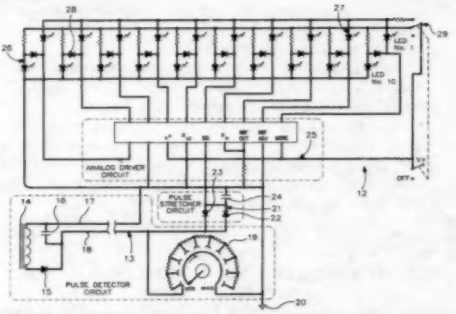
**4,942,362**

## APPARATUS FOR TESTING IGNITION SYSTEMS

**Jeffrey Lance, 8776 Ellsworth Cir., Santee, Calif. 92071**

**Filed Apr. 3, 1989, Ser. No. 332,485**
**Int. Cl.[5] F02P 17/00**
**U.S. Cl. 324—402** **3 Claims**



**1.** An analyzation apparatus for ignition systems comprising:

a. a first circuit having a pulse detector circuit with a non-intrusive induction type pick-up pulse detector generating an AC signal proportional to magnetic field variations caused by pulsating current flowing through an ignition circuit wire;

b. a first diode rectifier in the pulse detector circuit to convert the AC signal to a pulsating DC signal;

c. a first capacitor across a first lead and a second lead of the pulse detector circuit to eliminate unwanted signal noise;

d. an attenuator in the pulse detector circuit across the second lead and a ground lead to control an amplitude of the signal from the first diode rectifier;

e. a pulse stretching circuit in the first circuit having a second diode, a third diode and a second capacitor connected to the first lead and to the ground lead to increase the duration of the signal from the first diode rectifier;

f. an LED analog driver circuit in the first circuit that senses the signal from the pulse stretching circuit and converts the signal into a linear voltage;

g. two LED display circuits in the first circuit to provide a visual display proportional to the amplitude of the signal received from the driver circuit and connected in parallel to the driver circuit;

h. a plurality of fourth diodes placed between the LED circuits to prevent current flow from passing from an LED of one of the LED circuits to an adjacent LED of another LED circuit and illuminating the LED of the adjacent LED circuit;

i. a function selector switch in the first circuit connected between the LED analog driver circuit and selectively to one of the LED circuits to selectively direct current to one of the LED circuits and to interrupt current flow to the LED circuits; and

j. power leads connected to the first circuit to provide power to the first circuit from a power source.

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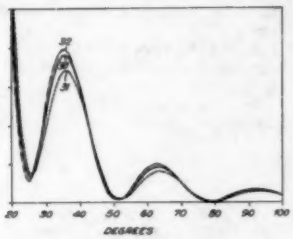
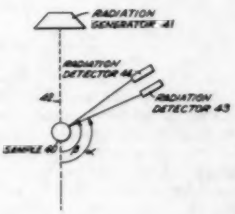
**4,942,363**

## APPARATUS AND METHOD FOR MEASURING TWO PROPERTIES OF AN OBJECT USING SCATTERED ELECTROMAGNETIC RADIATION

**David A. Lowitz, Richmond, Va., assignor to Philip Morris Incorporated, New York, N.Y.**

**Filed Apr. 25, 1989, Ser. No. 342,872**
**Int. Cl.[5] G01R 27/04**
**U.S. Cl. 324—631** **35 Claims**




**22.** A method for monitoring two components of an object, said object having a dielectric constant, each of said components contributing to said dielectric constant, the contribution of one of said components to said dielectric constant varying substantially over a selected frequency range and the contribution of the other of said components being substantially constant over said selected frequency range, said method comprising the steps of:

directing a beam of electromagnetic radiation linearly polarized in a predetermined direction along a predetermined line of incidence toward said object, said beam of electromagnetic radiation comprising at least two frequency components within said selected frequency range; wherein:

said object scatters said beam of radiation through reflection, interference and refraction as a function of scattering angle, the intensity of scattered radiation forming an angular scattering intensity spectrum for each of said fre-

quency components, each of said spectra varying between localized maxima and minima as a function of scattering angle; said method further comprising:

detecting the angular scattering intensity spectra and generating signals relating to the intensity of radiation scattered from said object at each of said frequency components and polarized only in a direction parallel to said predetermined direction, said signals being characteristic of said angular scattering intensity spectra for radiation polarized in said predetermined direction at said frequencies, such that said generated signals would be known intensity signals if said components of said object were present at predetermined levels, said generated signals having intensities differing from said known intensities when said components of said object differ from said predetermined levels; and

indicating deviation of the level of each of said components of said object from each said predetermined level based on said differing intensity signal for each of said frequency components and to relative amounts by which each of said differing intensity signals differs from its corresponding known intensity signal, thereby indicating the level of each of said components of said object.

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**4,942,364**

**MOISTURE AND DEW-DETECTION SENSOR**

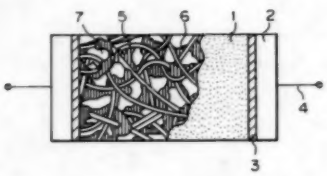
**Jun-ichi Nishijima, Kstano, and Minoru Fukui, Suita, both of Japan, assignors to Asahi Kasei Kogyo Kabushiki Kaisha, Osaka, Japan**

**Filed Feb. 14, 1989, Ser. No. 310,179**

**Claims priority, application Japan, Feb. 19, 1988, 63-35394; May 16, 1988, 63-117064**

**Int. Cl.[5] G01R *27/08***

**U.S. Cl. 324—696** **10 Claims**




1. A moisture and dew-detection sensor comprised of a nonwoven fabric and a moisture sensing resistive substance adhered in a substantially continuous and dispersed state to said nonwoven fabric, said moisture sensing resistive substance including a mixture of a nonionic hygroscopic high polymer and a conductive particle, and a plurality of continuous fine voids formed therein.

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**4,942,365**

**SYNCHRONOUS PHASE AND/OR FREQUENCY DETECTION SYSTEM**

**James R. Satterwhite, Roxboro, N.C., assignor to Teltest Electronics Laboratories, Inc., Roxboro, N.C.**

**Filed Jul. 24, 1989, Ser. No. 384,414**

**Int. Cl.[5] H03L *7/00*; H03K *9/06***

**U.S. Cl. 328—134** **9 Claims**

1. A detection circuit for detecting and determining the magnitude of a synchronous frequency signal whose phase relationship to a given reference frequency is known or unknown or a non-synchronous signal near the reference frequency, comprising:

(a) a first synchronous detector;

(b) a second synchronous detector;

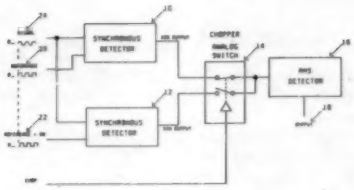
(c) a first signal source means providing:

(i) a first signal comprising a first reference frequency fed to the input side of said first synchronous detector; and

(ii) a second signal comprising a second reference frequency having a plus 90 degree phase relation to the first reference frequency, said second signal being fed to the input side of said second synchronous detector;

(d) a second signal source means providing a third signal comprising a signal to be detected and whose magnitude is to be determined and characterized by being either a synchronous frequency signal whose phase relationship to the first reference frequency is known or unknown or a non-synchronous signal near the first reference frequency, said third signal being fed to the input sides of both said first and second synchronous detectors;

(e) a chopper analog switch having two parallel single pole switches with input and output sides and one of which on its input side is connected to the output of the first synchronous detector and the other of which on its input side is connected to the output of the second synchronous detector;




(f) a RMS detector having input and output sides, the output sides of said single pole switches being connected to the input side of said RMS detector;

(g) a square wave driven chop frequency source connected to means operative to open and close said single pole switches at opposite times at said chop frequency, said chop frequency being higher than the output frequency of said synchronous detectors; and

(h) wherein said first synchronous detector provides a COS Output, said second synchronous detector provides a SIN Output and said RMS detector provides an output indicative of the presence and magnitude of said third signal and if the relative phase of the input signal to the reference is "a" degrees, said COS and SIN outputs being defined by the relation COS *Output* $=0.636\times$*Peak Signal*$\times$COS($a$) and SIN *Output*$=0.636\times$*Peak Signal*$\times$SIN($a$).

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**4,942,366**

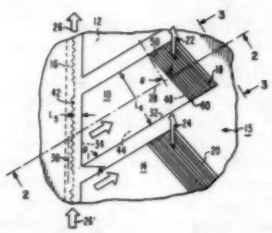
**AMPLIFIER DEVICE WITH COUPLED SURFACE EMITTING GRATING**

**Minoru Toda, Lawrenceville, N.J., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Mar. 21, 1989, Ser. No. 326,714**

**Int. Cl.[5] H01S *3/19*; H01L *33/00***

**U.S. Cl. 330—4.3** **15 Claims**



1. An optical device comprising:

a semiconductor optical amplifier having an optical axis intersecting opposite amplifier ends; and

a surface emission optical grating comprising a plurality of elements optically coupled to the amplifier at one of said ends, said grating having grating elements oriented non-perpendicular to said optical axis at a first angle, the amplifier and said grating orientation angle being arranged to reflect light out of said amplifier.

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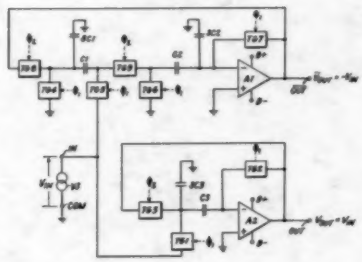
4,942,367

## AUTO-ZEROING SWITCHED-CAPACITANCE BUFFER AMPLIFIERS WITH MINUS-UNITY VOLTAGE GAIN

Miran Milkovic, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.

Filed Sep. 29, 1989, Ser. No. 414,508
Int. Cl.[5] H03F 1/02
U.S. Cl. 330—9 13 Claims



1. A switched-capacitance amplifier comprising:

a common terminal for receiving a reference voltage;

an input signal terminal for receiving an input signal voltage as referred to said reference voltage;

an inverted output signal terminal for supplying, during each of a second series of separated time intervals interleaved without overlap with a first series of separated time intervals, an inverted output signal voltage that is the negative of the voltage at said input signal terminal, as referred to said reference voltage;

first and second capacitors, each having respective first and second plates;

a first differential-input amplifier having an output connection to said inverted output signal terminal, having a non-inverting input connection to said common terminal, having an inverting input connection, and having an input port between its non-inverting and inverting input connections with which an input offset error voltage is associated;

first selective connection means for connecting, during each of said first series of separated time intervals, the first and second plates of said first capacitor respectively to said common terminal and to said input signal terminal, for charging said first capacitor to said input signal voltage;

second selective connection means for connecting, during each of said first series of separated time intervals, the first and second plates of said second capacitor respectively to said common terminal and to the inverting input connection of said first differential-input amplifier, for charging said second capacitor to the input effect error voltage of said first differential-input amplifier; and

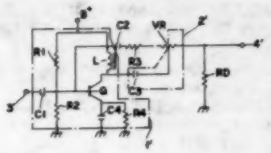
third selective connection means for connecting during each of said second series of separated time intervals said first capacitor, said second capacitor and the input port of said first differential-input amplifier in a first series connection between said inverted output signal terminal and said common terminal.

4,942,368

## SIGNAL FEEDBACK AMPLIFIER FOR A CABLE-TV CONVERTER

Frederick H. Moon, Seoul, Rep. of Korea, assignor to Samsung Electro-Mechanics Co., Ltd., Suwon-City, Rep. of Korea

Filed Apr. 25, 1989, Ser. No. 343,154
Claims priority, application Rep. of Korea, Apr. 27, 1988, 88-5993
Int. Cl.[5] H03G 3/12
U.S. Cl. 330—282 10 Claims



1. In an amplifier system for a cable-TV converter, the amplifier system having an amplifier having a transistor with a base connected to an input port of the amplifier system that provides a video IF signal and a collector for connection to an output port of the amplifier system, the improvement comprising:

variable gain means connected between the collector of the transistor and the output port for varying the gain therebetween;

variable negative feedback means forming a closed loop between the collector and the base of the transistor for varying negative feedback of the variable negative feedback means inversely with the gain of the variable gain means; and

impedance matching means connected between the variable gain means and the output port for maintaining a substantially constant output impedance at the output port.

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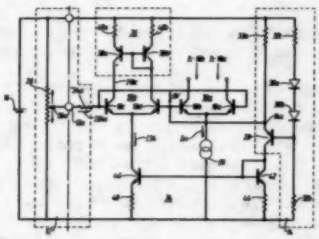
4,942,369

## CONTROLLED CURRENT PRODUCING DIFFERENTIAL CIRCUIT APPARATUS

Chikashi Nakagawara; Akihiro Murayama, both of Kanagawa, and Shigeru Nakamura, Nigata, all of Japan, assignors to Kabushiki Kaisha Toshiba, Kanagawa, Japan

Filed Mar. 18, 1988, Ser. No. 170,376
Claims priority, application Japan, Mar. 20, 1987, 62-64215; Mar. 30, 1987, 62-76641
Int. Cl.[5] H03F 3/04
U.S. Cl. 330—296 9 Claims



1. A controlled current producing differential circuit apparatus, comprising:

control voltage supply means for supplying a control voltage in response to a power supply voltage subject to unexpected fluctuation;

reference voltage supply means responsive to the power supply voltage for supplying a predetermined reference voltage; and

differential circuit means coupled to the control voltage supply means and the reference voltage supply means for outputting a controlled output current in response to the difference between the control voltage and the reference voltage and for compensating for fluctuations in the power supply voltage.

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**4,942,370**

**PLL CIRCUIT WITH BAND WIDTH VARYING IN ACCORDANCE WITH THE FREQUENCY OF AN INPUT SIGNAL**

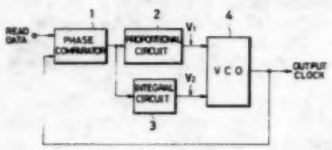
**Toshihiro Shigemori, Yokohama, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Apr. 4, 1989, Ser. No. 333,299**

**Claims priority, application Japan, Apr. 8, 1988, 63-85156; Jun. 23, 1988, 53-153494**

**Int. Cl.[5] H03L** *7/087, 7/093*

**U.S. Cl. 331—1 A** **8 Claims**




1. A phase loop (PLL) circuit comprising:

phase comparing means for receiving an input signal and an output clock signal, detecting a difference in phase between these two signals, and outputting a first signal according to said phase difference;

proportional means for converting said first signal to a first voltage having an amplitude proportional to said phase difference;

integral means for converting said first signal to a second voltage having an amplitude proportional to an integral value of said phase difference; and

voltage-controlled oscillating meands for receiving said first and second voltages and generating said output clock signal having a frequency controlled by said first and second voltages,

a frequency $F_0$ of said output clock signal being represented by the following formula,

$$F_0 = \frac{1}{a} \frac{V_1 + b}{V_2 + c}$$

where said first and second voltages are respectively designated by $V_1$ and $V_2$, and the values, a, b, and c are constants.

2. A phase locked loop (PLL) circuit comprising:

phase comparing means for receiving an input signal and an output clock signal, detecting a first difference in phase between these two signals, and outputting a first signal corresponding to said first phase difference;

signal processing means for detecting a second difference in phase between said output clock signal and a reference clock signal having a predetermined frequency, outputting a second signal corresponding to said second phase difference while said PLL circuit is in a first state where no input signals are received by said phase comparing means, and outputting a third signal while said PLL circuit is in a second state where input signals are received by said phase comparing means, said third signal having a magnitude equal to an average value of the second signal outputted for a predetermined period just before said PLL circuit is changed to be in said second state from said first state;

filter means for outputting a voltage signal corresponding to said second signal when said PLL circuit is in said first state, corresponding to a sum of said first signal and said third signal when said PLL circuit is in said second state; and

voltage-controlled oscillating means for generating said output clock signal having a frequency corresponding to said voltage siganl.

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**4,942,371**

**PHASE-LOCKED LOOP HAVING IMPROVED INPUT JITTER CHARACTERISTICS**

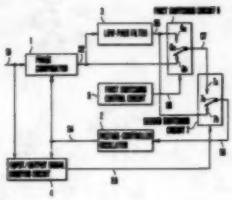
**Satoshi Kashiwaba, and Masahiro Nakajima, both of Tokyo Japan, assignors to NEC Corporation, Japan**

**Filed Aug. 28, 1989, Ser. No. 399,330**

**Claims priority, application Japan, Aug. 31, 1988, 63-217936**

**Int. Cl.[5] H03L** *7/093*

**U.S. Cl. 331—14** **3 Claims**



3. A method for establishing phase synchronization in a phase-locked loop (PLL), including phase comparator means, low-pass filter means, and a voltage-controlled oscillator, comprising:

detecting a phase difference between an input signal and an output signal from said voltage-controlled oscillator;

extracting a low-frequency signal component from the detection result;

selecting one of the detection result and the low-frequency signal component; and

providing to said voltage controlled oscillator the selection result or the low-frequency signal component in accordance with a synchronization/asynchronization state of said voltage-controlled oscillator and frequency components of the input signal.

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**4,942,372**

**METHOD AND CIRCUIT FOR REDUCTION OF TEMPERATURE DEPENDENCY IN AN OSCILLATOR**

**Peter Heimlicher, Klein-Schoenberg 112, CH-1700 Fribourg, Switzerland**

**Filed Nov. 17, 1988, Ser. No. 272,350**

**Claims priority, application Switzerland, Dec. 1, 1987, 4679/87**

**Int. Cl.[5] H03B** *5/08;* **H03L** *1/00*

**U.S. Cl. 331—65** **9 Claims**

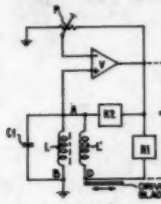
1. A method for reducing the temperature dependency of the oscillating properties of an LC-oscillator having an oscillating circuit including a coil having temperature dependent copper losses; a condenser; and an amplifier means having input means and output means, said input means and said output means being connected to said oscillating circuit; comprising the steps of:

inserting a first positive feedback path having a temperature dependent feedback characteristic between said output means and said oscillating circuit;

inserting a second feedback path having a temperature inde-

pendent feedback characteristic between said output means and said oscillating circuit;

varying the attenuation of said oscillating circuit; and



varying the feedback characteristics of said second path to compensate for said variable attenuation.

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**4,942,373**

## THIN FILM DELAY LINES HAVING A SERPENTINE DELAY PATH

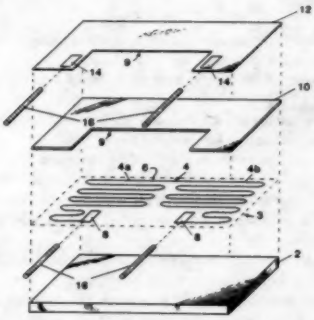
**Paul Ozawa; Mark Brooks, and Fumitoshi Nakanata, all of Norta Mankato, Minn., assignors to Thin Film Technology Corporation, North Mankato, Minn.**

**Filed Apr. 11, 1988, Ser. No. 180,353**

**Claims priority, application Japan, Jul. 20, 1987, 62-181877; Oct. 14, 1987, 62-258645**

**Int. Cl.[5] H01P 9/00**

**U.S. Cl. 333—161** **14 Claims**



1. Thin film delay line apparatus comprising:

(a) an insulative support substrate;

(b) a conductive signal layer deposited over said substrate to provide a patterned serpentine conductor of a predetermined length and weaving back and forth upon itself and terminating in at least first and second contact pads;

(c) a first dielectric layer printed over said signal layer except in the area of said first and second contact pads;

(d) a conductive ground layer deposited over said first dielectric layer except in the area of said first and second contact pads and having third and fourth contact pads thereto;

(e) means for making electrical contact to said first, second, third and fourth contact pads;

(f) means for encapsulating said delay line apparatus; and

(g) wherein the inductive and capacitive characteristics of said signal and ground layers and said first dielectric layer relative to one another and between adjacent portions of the serpentine signal layer are such that a signal applied to said first contact pad takes a known time in the range of 1 to 10 nanoseconds to reach said second contact pad.

**4,942,374**

## PHASE-LOCKED LOOP TYPE SYNTHESIZER HAVING MODULATION FUNCTION

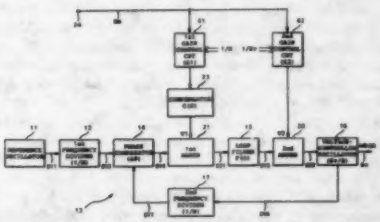
**Kenji Sai, Mitaka, Japan, assignor to Japan Radio Co., Ltd., Tokyo, Japan**

**Filed Apr. 25, 1989, Ser. No. 343,484**

**Claims priority, application Japan, Apr. 26, 1988, 63-103702**

**Int. Cl.[5] H03C 3/08, 3/09**

**U.S. Cl. 332—124** **3 Claims**



2. In a phase-locked loop type synthesizer comprising a phase-locked loop circuit which comprises a phase comparator, a lop filter, a voltage controlled oscillator having a gain Kv, a circuit for feeding back an output from said voltage controlled oscillator to said phase comparator through a frequency divider having a frequency division ratio N, a first adder for adding a modulation signal through a compensator to an output of said phase comparator to produce a first composite signal, said first composite signal being applied to said loop filter, and a second adder for adding said modulation signal to an output of said loop filter to produce a second composite signal, said second composite signal being applied to said voltage controlled oscillator,

the improvement wherein:

said voltage controlled oscillator has a fixed gain; and

a gain control circuit is coupled in an input line of said modulation signal for said compensator, said gain control circuit having a variable gain G1 which is adjusted to be in inverse proportion to said frequency division ratio N of said frequency divider.

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**4,942,375**

## VARIABLE ATTENUATION DEVICE INTENDED TO BE INSERTED BETWEEN A TRANSMITTER CIRCUIT AND LOAD CIRCUIT

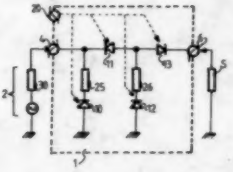
**Gilbert Petitjean, Igny; Michel Lebourg, Clamart, and Christian Le Tortorec, Montigny Le Bretonneux, all of France, assignors to U.S. Philips Corporation, New York, N.Y.**

**Continuation of Ser. No. 210,269, Jun. 23, 1988, abandoned. This application Sep. 15, 1989, Ser. No. 408,455**

**Claims priority, application France, Jun. 30, 1987, 87 09208**

**Int. Cl.[5] H01P 1/22**

**U.S. Cl. 333—81 R** **5 Claims**



1. A broadband variable attenuator, having a high attenuation range suitable for use as a modulator with a transmitter

and a load impedance, said broadband variable attenuator comprising:

a signal transmission path having an input end and an output end and comprising a series pair of p-i-n diodes of opposite relative polarity in series with the input and output ends of said signal transmission path, whereby the impedance of said signal transmission path is dependent upon the impedance of said series pair of p-i-n diodes;

a first signal shunt path between the input end of said signal transmission path and ground, said first signal shunt path comprising a p-i-n diode and an impedance element connected in series, said impedance element having an impedance value selected to match an internal impedance of a transmitter connected in operation to said input end of said signal transmission path, whereby the impedance of said first signal shunt path is dependent upon the impedance of said p-i-n diode thereof;

a second signal shunt path between the junction of said series pair of p-i-n diodes and ground, said second signal shunt path comprising a p-i n diode and an impedance element connected in series, said impedance element having an impedance value selected to match a load impedance connected in operation to said output end of said signal transmission path, whereby the impedance of said second signal shunt path is dependent upon the impedance of said p-i-n diode thereof;

all of said p-i-n diodes having minority carrier lifetimes of about 3 to 5 microseconds, and a resistance to current ratio between about 35 to 80 ohms at one milliampere and greater than 350 ohms at 100 microamperes; and

biasing means responsive to a control bias signal for controllably biasing said p-i-n diodes with respective direct currents effective to change the impedance value of said series pair of p-i-n diodes in one direction and simultaneously change the impedance values of said p-i-n diodes of said first and second shunt signal paths in the opposite direction, whereby the attenuation level of said attenuator is variable under control of the control bias signal between a high attenuation level with said signal transmission path having a high impedance and said signal shunt paths having a low impedance, and a low attenuation level with said signal transmission path having a low impedance and said signal shunt paths having a high impedance.

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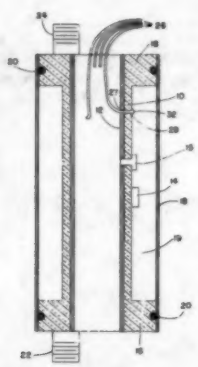
**4,942,376**

## TUBULAR MICROWAVE PHASE SHIFTER

**William G. Sterns, Canoga Park, Calif., assignor to ITT Corporation, New York, N.Y.**

**Filed Feb. 17, 1989, Ser. No. 311,793**
**Int. Cl.[5] H10P 1/18**
**U.S. Cl. 333—160** **6 Claims**



1. A microwave circuit structure having a support structure in the shape of a light weight dielectric cylinder, a cylindrical ground plane on the inside of said dielectric cylinder, a microstrip phase shifter circuit on the outside of said dielectric cylinder, and a cylindrical shield mounted coaxially around the circuit spaced therefrom by a second dielectric.

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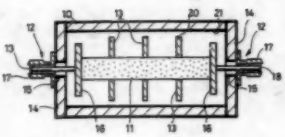
**4,942,377**

## ROD TYPE DIELECTRIC RESONATING DEVICE WITH COUPLING PLATES

**Youhei Ishikawa; Kikuo Tsunoda; Toshiro Hiratsuka, and Hirotsugu Abe, all of Kyoto, Japan, assignors to Murata Manufacturing Co., Ltd., Japan**

**Filed May 23, 1988, Ser. No. 197,693**
**Claims priority, application Japan, May 29, 1987, 62-85099[U]; May 30, 1987, 62-137500; May 30, 1987, 62-137501**
**Int. Cl.[5] H01P 1/20, 7/10**
**U.S. Cl. 333—202** **19 Claims**



1. A dielectric resonating device, comprising:

a conductive case;

a bar-shaped dielectric resonator body located within the case;

exciting means adjacent said resonator body for exciting the dielectric resonator body; and

at least one plate located extending between the case and the dielectric resonator body, which segments the dielectric resonator body into at least one pair of resonating segments within said case on either side of said at least one plate,

a radially inner portion of said at least one plate being fixed to said dielectric resonator body, and

an outer periphery of said at least one plate being disposed at a location facing said case to define a gap for coupling adjustment between said pair of resonating segments.

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**4,942,378**

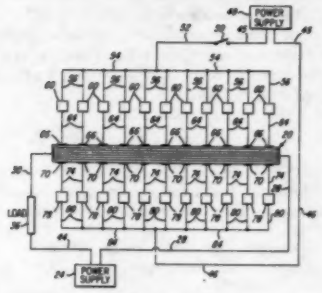
## HIGH-SPEED SUPERCONDUCTING SWITCH AND METHOD

**John P. Barber, Dayton, Ohio, assignor to IAP Research, Inc., Dayton, Ohio**

**Filed May 26, 1989, Ser. No. 358,156**
**Int. Cl.[5] H01F 7/22**
**U.S. Cl. 335—216** **16 Claims**

1. A superconductive switch device comprising a body of superconductive material having a primary current conduction plane within which primary current flows, means for conducting control current through the body of superconductive material in a direction substantially normal to the primary conduc-

tion plane, whereby primary current flow in the primary current conduction plane ceases as current flows through the body of superconductive material in a direction substantially normal to the primary conduction plane.

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**4,942,379**

## SUPERCONDUCTOR FOR MAGNETIC FIELD SHIELD

**Souichi Ogawa; Takao Sugioka, and Masaru Inoue, all of Osaka, Japan, assignors to Osaka Prefecture and Koatsu Gas Kogyo Co., Ltd., both of Osaka, Japan**

**Filed Oct. 3, 1989, Ser. No. 416,712**
**Claims priority, application Japan, Oct. 3, 1988, 63-250546**
**Int. Cl.[5] H01F *7/22***
**U.S. Cl. 335—301** **9 Claims**

1. A superconductr for magnetic field shield comprising closed-ring disc-shaped superconductive magnetic field shielding members and spacing members having the same shape as that of said magnetic field shielding member and alternately laminated with said shielding members, said superconductor for magnetic field shield being characterized in that said shielding member is comprised of a superconductive layer having a thickness of 500 μm or less and closely laminated with metal layers having superior thermal and electrical conductivity and that the ring width of said superconductive layer is 2 mm or more.

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**4,942,380**

## HOUSING ASSEMBLY HAVING FLEXIBLE SHIELD AND INSULATOR

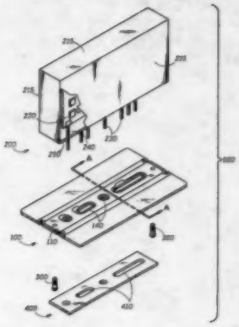
**William M. Bradford, Ft. Lauderdale; Lloyd W. Silvern, Coral Springs, and Gerard A. Dennis, Ft. Lauderdale, all of Fla., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Jan. 23, 1989, Ser. No. 299,205**
**Int. Cl.[5] H01F *7/00***
**U.S. Cl. 335—301** **11 Claims**

1. An electromagnetically shielded housing assembly comprising:

a substantially rigid housing member having an open side for receiving an electrical circuit;

a flexible member including conductive material,



means for affixing said flexible member to said housing member, so as to substantially cover said open side; and provide electrical contact between said flexible member and said housing member.

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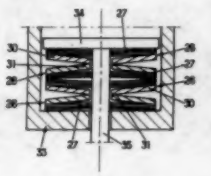
**4,942,381**

## DRIVING ELEMENT WITH A THIN PART, DEFORMABLE IN THE DIRECTION OF ITS THICKNESS

**Jean C. Cambien, Sassenage, France, assignor to Delta Concept S.A., Grenoble, France**

**Division of Ser. No. 315,376, Oct. 26, 1988, Pat. No. 4,914,415.**
**This application Nov. 9, 1989, Ser. No. 433,246**
**Claims priority, application France, Feb. 27, 1987, 87 02685**
**Int. Cl.[5] H01H *37/52***
**U.S. Cl. 337—370** **6 Claims**



1. Driving element comprising:

at least two disks deformable in the the direction of their thickness so as to occupy arcuate positions,

each disk being provided with at least two opposed tabs extending radially and having their outer end parts fixed on an outer part of the disk and their free end being above a central area of the disk surface,

said disks being disposed one on the other and forming a stack in which said disks are deformable in opposite directions,

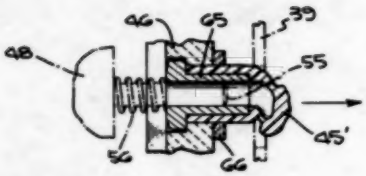
said stack being positionable between a support and a member to be actuated in the direction of an axis of said stack by the movement of said free ends of said tabs of said disks.

**4,942,382**

## ELECTRICAL SWITCH MECHANISM HAVING TWO RELEASE MODES

**Robert L. Burmeister, Yorba Linda, Calif., assignor to W. P. Dawson, Inc., Brea, Calif.**

**Filed Nov. 29, 1989, Ser. No. 443,256**
**Int. Cl.[5] H01H** *37/76, 71/20*
**U.S. Cl. 337—403** **3 Claims**




3. In a normally closed electrical switch mechanism having fixed and movable switch assemblies, spring means urging the movable switch assembly away from engagement with the fixed switch assembly to thereby open the switch, a latch member normally securing the movable switch assembly in its position of engagement with the fixed switch assembly, and means responsive to a predetermined condition external to the switch mechanism for moving the latch member so as to allow the switch to open, the improvement comprising:

a member made of thermoplastic material and positioned between the latch member and the movable switch assembly, the thermoplastic material of said member being responsive to an overheated condition of the internal switch circuitry for losing its structural rigidity so as to release the movable switch assembly and thereby permit the spring means to open the switch even though the latch member remains in place.

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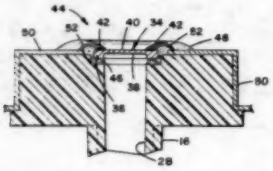
**4,942,383**

## LOW COST WET-TO-WET PRESSURE SENSOR PACKAGE

**Man K. Lam, and Milton W. Mathias, both of Colorado Springs, Colo., assignors to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 6, 1989, Ser. No. 320,170**
**Int. Cl.[5] H01L** *10/10*
**U.S. Cl. 338—42** **15 Claims**




1. A pressure sensor package, which comprises:

a housing defining a chamber bounded in part by opposing spaced-apart top and bottom end walls;

a pressure-sensitive die disposed in a recess in the bottom end wall of said housing;

said die including a peripheral edge, a reduced central portion, a top surface with a piezoresistive circuit in the central portion connected to a plurality of exposed circuit elements including contact pads on the peripheral edge, and a bottom surface;

a lead frame secured to the bottom end wall of said housing in spaced relationship with said die, said lead frame including a plurality of internal and external end portions;

a plurality of wire bonds interconnecting the contact pads of said die and the internal end portions of said lead frame; and

bead means for suspending said die between the recess in the bottom end wall of said housing, the internal end portions of said lead frame, and intermediate portions of the bottom end wall of said housing and for protectively covering the exposed circuit elements and contact pads on said die and said wire bonds therein, without overlapping the reduced central portion of said die.

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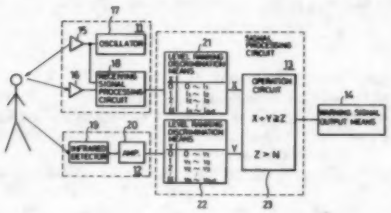
**4,942,384**

## COMPOSITE TYPE CRIME PREVENTIVE SENSOR

**Kazumasa Yamauchi, Suita, and Susumu Katayama, Hirakata, both of Japan, assignors to Matsushita Electric Works, Ltd., Osaka, Japan**

**Filed Mar. 31, 1989, Ser. No. 331,367**
**Claims priority, application Japan, Apr. 8, 1988, 63-87644; May 26, 1988, 63-128652**
**Int. Cl.[5] G08B** *13/00*
**U.S. Cl. 340—522** **7 Claims**




1. A composite type crime preventive sensor comprising: a plurality of sensor units respectively of different detecting systems and employed in combination with one another, means for processing output detecting signals from said sensor units, said means for processing output detection signals including means for correlating each of said output detection signals from the respective sensor units with a corresponding one of a plurality of grades depending on signal level to provide a ranked level value for each of said output detection signals, and means for providing as an output an intruder discrimination signal when a sum of the ranked level values is above a preset reference value, wherein said preset reference value is set to be larger than the largest ranked level of said ranked level values.

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**4,942,385**

## PHOTOELECTRIC INTRUSION DETECTOR

**Shinji Kobayashi, Tokyo; Koichi Takada, Kanagawa; Kazuo Watanabe, Kanagawa, and Motoharu Mitsuse, Kanagawa, all of Japan, assignors to Hochiki Corporation, Tokyo, Japan**

**Filed Dec. 22, 1988, Ser. No. 288,691**
**Claims priority, application Japan, Dec. 24, 1987, 62-196374[U]; Jul. 28, 1988, 63-189179**
**Int. Cl.[5] G05B** *13/18*
**U.S. Cl. 340—556** **4 Claims**

1. A photoelectric intrusion detector comprising:

light sensitive means for receiving a pulsed light projected from a light emitting unit at a place remote from said light emitting unit to generate a corresponding electric signal;

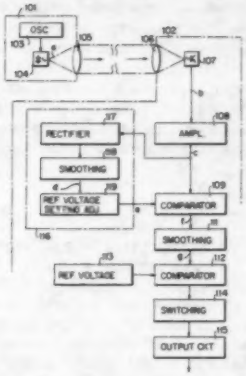
first comparison means for comparing said electric signal with a reference voltage to remove a noise component lower than said reference voltage from said electric signal;

circuit means for receiving an output from said first comparison means to generate an output signal having a DC level corresponding thereto;

second comparison means for comparing the DC level signal generated by said circuit means with a predetermined

threshold value to generate an output when said DC level is lower than said threshsold value;

alarm signal generating means for generating an alarm output when the output of said second comparison means lasts over a predetermined storage time; and




reference voltage generating means for producing a voltage output varying to follow variations of the output from said light sensitive means with a predetermined delay time exceeding the storage time of said alarm signal generating means so as to apply said voltage output to said first comparison means as said reference voltage.

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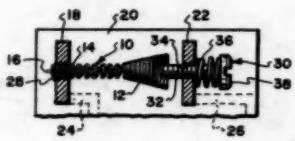
**4,942,386**

## INTEGRATED IMPACT DETECTION AND ALARM SYSTEM

**Billy R. Willis, 20219 Londelius St., Canoga Park, Calif. 91306**

**Filed Dec. 16, 1988, Ser. No. 285,777**
**Int. Cl.[5] G08B *13/00*; H01H *35/02***
**U.S. Cl. 340—566** **18 Claims**



1. An integrated alarm system for protecting electronic machines against tampering comprising;

an alarm circuit for activating one or more alarms; mounting means mounting said alarm circuit in said electronic machine;

one or more alarm switches for activating said alarm circuit in response to tampering;

said one or more alarm switches for activating said alarm circuit including at least one impact sensing means for sensing impact to said electronic machine;

said impact sensing means including a deflectable spring having an integrally formed conically tapered portion and a cylindrical portion tightly wound to form threads;

said mounting means including a threaded hole for mounting said deflectible spring;

said cylindrical threaded portion of spring being adjustably threaded into said hole with said conically tapered portion circumjacent an adjustable electrical contact so that the position of said conically tapered portion relative to said electrical contact can be adjusted by threading said spring into or out of said threaded hole to adjust the sensitivity range of said impact sensing means; said deflectable spring and electrical contact being connected to said alarm circuit so that a deflection of said conically tapered end of said spring that causes contact with said electrical contact causes activation of said alarm circuit.

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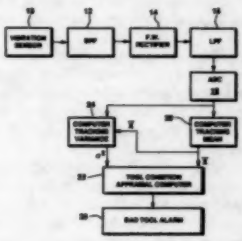
**4,942,387**

## APPARATUS AND METHOD FOR TOOL BREAK AND WEAR DETECTION

**Charles E. Thomas, Scotia, N.Y., assignor to General Electric Company, Schenectady, N.Y.**

**Filed Sep. 5, 1989, Ser. No. 402,600**
**Int. Cl.[5] G08B *21/00***
**U.S. Cl. 340—683** **24 Claims**



1. Apparatus for determining the condition of a tool, said apparatus comprising:

means for sensing the vibration of the tool to provide a vibration signal having AC and DC power components;

means for computing a first signal that is a function of said DC power component of said vibration signal;

means for computing a second signal that is a function of said AC power component of said vibration signal; and

means for comparing said first and second signals.

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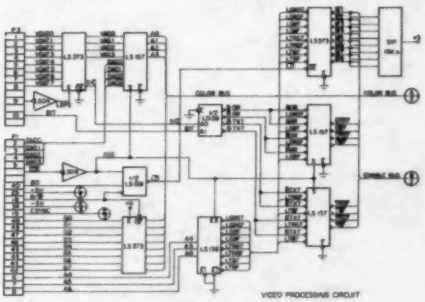
**4,942,388**

## REAL TIME COLOR DISPLAY

**William Reitman, Santa Ana, Calif., assignor to Grumman Aerospace Corporation, Bethpage, N.Y.**

**Filed Sep. 2, 1986, Ser. No. 902,584**
**Int. Cl.[5] G09G *5/04***
**U.S. Cl. 340—701** **7 Claims**



1. A color display system for converting input data into color drive signals wherein individual color intensity levels corresponding with individual data input signals may be selectively varied, said system comprising:

an interface circuit connectable to an external data source and first connector terminals of a general purpose pro-

grammable device having processing facilities, said interface circuit being adapted to transfer data and control signals between the programmable device and the data source;

a memory access circuit connectable to the data source and to second connector terminals of the programmable device, said memory access circuit comprising circuitry for generating address information for correspondence with data received from the data source, said memory access circuit being adapted to transfer said data from the data source and said corresponding address information to said second connector terminals of said programmable device; and

a video circuit connected to second and third connector terminals of said programmable device and an external color display, said video circuit further being connectable to receive said data from the data source via said third connector terminals and corresponding address information via said second connector terminals, said video circuit comprising:

color registers for storing color drive signals;

color coding circuitry for loading said color registers and said address information, said address information corresponding to desired color intensity levels such that particular data from the data source corresponds with particular color intensity levels; and

color translating circuitry for communicating said data from said data source to said color registers after said color registers have been loaded, said color translating circuitry being adapted to convert data from said data source into color drive signals for communication to an external color display;

wherein the processing facilities of said programmable device are utilized to generate address information loaded into the color registers, but the transfer of said data from said data source to said video circuit proceeds independent of said processing facilities; and

wherein the processing facilities of the programmable device do not participate in the conversion of data from said data source into color drive signals after the color registers are loaded.

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**4,942,389**

## DISPLAY CONTROL CIRCUIT

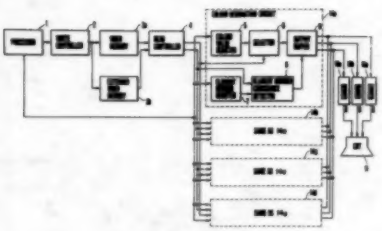
**Junji Hinami, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed May 20, 1988, Ser. No. 196,230**

**Claims priority, application Japan, May 22, 1987, 62-124017**

**Int. Cl.[5] G09G 1/00**

**U.S. Cl. 340—703** **4 Claims**



1. A display control circuit comprising:

a video memory for storing display data assigned with a plurality of bits corresponding to each pixel of a display screen of a display device;

rewritable color value register means rewritable by a processor;

selector means operably connected with said rewritable color value register means and with said video memory for selecting outputs from said rewritable color value register means in accordance with color signal information of the display data read out from said video memory;

element number register means for storing preset element numbers;

element number coincidence detector means operably connected with said element number register means and with said video memory for comparing element number information of the display data read out from said video memory with the preset element numbers; and

output buffer means operably connected with said element number coincidence detector means and with said selector means, controlled in accordance with an output from said element number coincidence detector means, for supplying a signal to a driver for said display device.

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**4,942,390**

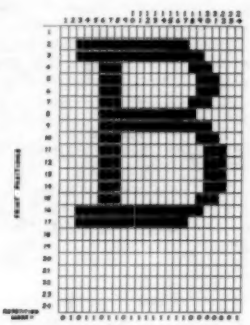
## METHOD AND APPARATUS FOR GENERATING A CHARACTER IMAGE

**Phuc K. Do, Charlotte; Karen K. Kellam, China Grove; Ronnie Chi-on Tong, Charlotte; Ronald W. Willis, Kannapolis, and Carol E. Wyke, Charlotte, all of N.C., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Apr. 1, 1987, Ser. No. 33,296**

**Int. Cl.[5] B41J 3/12**

**U.S. Cl. 340—735** **8 Claims**



1. A method of constructing a fully formed character out of print slices for a matrix printer comprising the steps of:

(a) selecting a character to be printed from a plurality of characters;

(b) selecting a compressed character, associated with said selected character, containing a set of only the first print slice of a series of repetitive print slices and any unique print slices of said fully formed character wherein said set of print slices of said compressed character are fewer in number than said print slices of said fully formed character;

(c) selecting a mask, associated with said compressed character, from a plurality of said masks, each of said masks having a plurality of bits in either a first state or second state, each of said bits being associated with one of said print slices so that there is a one-to-one correspondence between the number of bits of said mask and the number of slices of said fully formed character;

(d) testing each bit of said mask, to detect for either said first state or said second state;

(e) fetching a new one of said first or unique print slices, when said first state is detected;

(f) omitting the previous step when said second state is detected; and

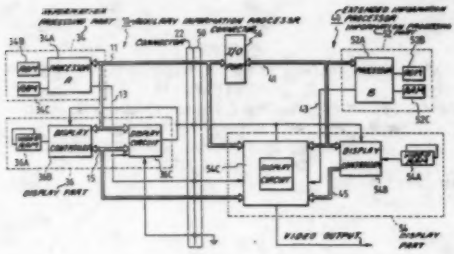
(g) printing the fetched print slices.

**4,942,391**

## PICTURE INFORMATION COMPOSITE SYSTEM

**Keiichi Kikuta, Osaka, Japan, assignor to NEC Home Electronics Ltd., Osaka, Japan**

**Filed Aug. 29, 1988, Ser. No. 237,521**
**Claims priority, application Japan, Aug. 31, 1987, 62-216974**
**Int. Cl.[5] G06F *3/14***
**U.S. Cl. 340—745** **7 Claims**



1. A picture information composite system comprising:
at least one extended information processor; and
at least one auxiliary information processor, each processor comprising means for outputting a video signal independent of the other and means for coupling said extended information processor to said auxiliary information processor, configured so that they may at least be electrically joined with one another, said information processors further comprising means such that when they are joined to one another by said coupling means, said auxiliary information processor stops creating its output video signal, reads out digital display data with a synchronizing signal from said extended information processor, and provides that data to said extended information processor, said extended information processor comprising means for creating a composite video image using its own digital display data and digital display data from said auxiliary information processor.

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**4,942,392**

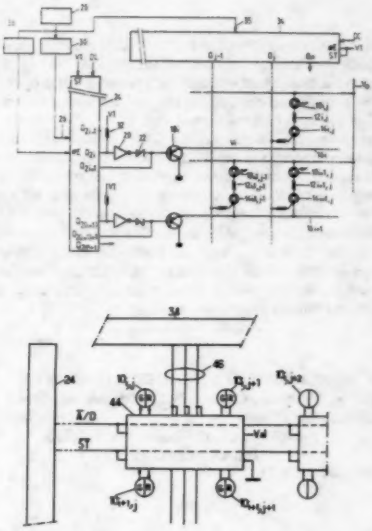
## OPTICAL DISPLAY DEVICE

**Marc Loret, Montrouge; Daniel Boutquet, Paris, and Yannick Le Pen, Mantes La Jolie, all of France, assignors to Sayag Electronic, France**

**Continuation of Ser. No. 881,897, Jul. 3, 1986, abandoned. This application Dec. 27, 1988, Ser. No. 289,527**
**Claims priority, application France, Jul. 3, 1985, 85 10177**
**Int. Cl.[5] G09G *3/32***
**U.S. Cl. 340—782** **10 Claims**

1. An optical display device having:
a plurality of LED light sources distributed in rows and columns at the nodal points of a rectangular array, each of said light sources having two electrodes one of which is continuously connected to a DC power source common to all said light sources providing a predetermined constant voltage V0,
a plurality of row lines each connected to the other electrodes of all of said light sources of a same one of said rows through respective thyristors, each thyristor being switchable to a conductive condition,
a plurality of column lines each connected to triggering inputs of all thyristors of a respective one of said columns and connected to a control circuit for applying voltages having either of two values to said column lines, and
circuit means for applying to each of said row lines, in succession:
a first predetermined voltage having a level causing switching to a conductive condition of those thyristors in the respective row which receive a voltage having a predetermined one of said two values,
a rest voltage maintaining the thyristors in the respective row in unchanged condition, and
a second predetermined voltage causing cut-off of all thyristors in the respective row.

5. An optical display device having:
a pluraltiy of LED light sources distributed in rows and columns at the nodal points of a regular lattice;
a plurality of solid state circuits individually connected to a LED light source energization electric power supply and each operatively associated with a respective set of k said LED light sources (k being an integer) for individual control of the energization of said LED light sources, each of said solid state circuits having a plurality of current generators each for delivering current to one of the k light sources of the associated set;
a column interface having a plurality of outputs connected via respective column lines to said solid state circuits for delivering condition signals representative of conditions to be given to said LED light sources one row at a time, said column lines constituting bus lines each for individually addressing the k light sources of the associated set and providing data representing the electric current values to be delivered by the respective current generators; and

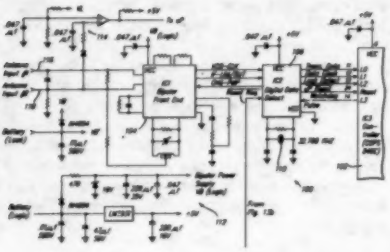


a row interface having a plurality of outputs connected via respective row lines to said circuits for selecting one row to be controlled at a time among said rows, said row lines comprising at least a strobe line per circuit,
said solid state circuits being arranged for maintaining each of said LED light sources in energized condition after it has been energized by said column interface until a new condition signal is applied to the respective solid state circuit,
wherein each of said solid state circuits comprises additional means for adjusting a maximum value of the currents delivered by said current generators in response to data delivered by said row and column lines to all said circuits at the same time and wherein said data representing the electric current values identify a percentage of said maximum value.

## 4,942,393
## PASSIVE KEYLESS ENTRY SYSTEM

**Thomas J. Waraksa, Clarkston; Keith D. Fraley, Drayton Plains, both of Mich.; Richard E. Kiefer, Boulder, Colo.; Daniel G. Douglas, Louisville, Colo., and Lee H. Gilbert, Boulder, Colo., assignors to Lectron Products, Inc., Rochester Hills, Mich.**

**Filed May 27, 1988, Ser. No. 199,476**
**Int. Cl.[5] G08C** *19/00*; **E05B** *65/36*
**U.S. Cl. 340—825.72** **8 Claims**



1. A keyless entry system for a vehicle having an electric door lock mechanism, and including:

a portable beacon adapted to be carried by the operator of the vehicle and comprising transmitter means for transmitting a coded beacon signal; and

receiver means associated with the vehicle and including antenna means for receiving said beacon signal when said beacon is within a predetermined range and controller means for decoding said beacon signal and activating a predetermined function associated with the vehicle in response thereto, said controller means being further adapted to automatically activate said electric door lock mechanism to lock the doors of the vehicle after the operator leaves the vehicle and carries said beacon out of said predetermined range.

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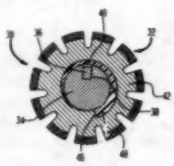
## 4,942,394
## HALL EFFECT ENCODER APPARATUS

**Donatas V. Gasiunas, Carmel, N.Y., assignor to Pitney Bowes Inc., Stamford, Conn.**

**Filed Dec. 21, 1987, Ser. No. 135,793**
**Int. Cl.[5] G08C** *19/06*
**U.S. Cl. 340—870.31** **6 Claims**



1. A printwheel encoder comprising:

(a) a Hall-effect sensor fixed to a shaft;

(b) magnetic means mounted in the shaft adjacent said Hall-effect sensor;

(c) a printwheel rotatably mounted in the shaft for rotation with respect to the sensor said printwheel having printing elements thereon;

(d) a flux-conducting ring disposed in the printwheel and encircling the shaft, said ring having an inner surface formed as a spiral surface which provides a gap between the ring and Hall-effect sensor that varies with the angular position of the printwheel, said Hall-effect sensor providing an output signal whose magnitude depends upon the position of the printwheel;

(e) means for receiving said output signal and for providing digital information corresponding to an output signal of the Hall-effect sensor at each printwheel setting; and

(f) means for storing the magnitude of the output signal associated with each printwheel setting for comparison and later determination of a particular printwheel setting in accordance with the comparison with previously stored values.

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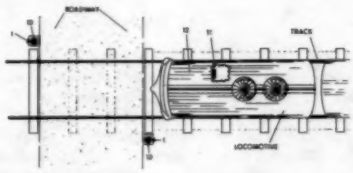
## 4,942,395
## RAILROAD GRADE CROSSING MOTORIST WARNING SYSTEM

**John S. Ferrari, 8030 E. Girard, Denver, Colo. 80231, and Dale C. Sommers, Box 867, Conifer, Colo. 80433**

**Filed Aug. 24, 1987, Ser. No. 88,579**
**Int. Cl.[5] G08G** *1/095*
**U.S. Cl. 340—907** **2 Claims**



1. A system for warning motorists of the approach of a locomotive and train into a highway/rail crossing, comprising:

a locomotive mounted, MHZ radio frequency transceiver "beacon," contructed to provide a constant, directional, outgoing radio signal, and which transceiver is provided with signaling means to inform a locomotive operator that the outgoing radio signal has been received; and

an intermittently active, railroad crossing "crossbuck" pole-mounted, encased and weatherproofed, MHZ radio frequency transceiver unit, powered and hardwired in conjunction with existing railroad crossing electrical circuitry, said transceiver activates and emits a omnidirectional, low power, coded shortwave radio signal emanated from aforesaid locomotive-mounted transceiver when in near proximity to one another; and

an encased, miniaturized, motor vehicular-mounted, radio frequency compatible, radio frequency sympathetic, radio frequency discriminatory microprocessor receiver unit, provided with multiple visual/audio marked displays upon an integral faceplate; said receiver being powered by the vehicle's battery and said receiver sympathetically collects and discriminates signals emanating from said railroad crossing crossbuck pole mounted transceiver unit, to provide visual warning display and audio motorist alert to a "live railroad crossing" in near proximity.

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## 4,942,396
## TO-DIGIT-SERIAL CONVERTERS FOR SYSTEMS PROCESSING DATA IN DIGIT-SERIAL FORMAT

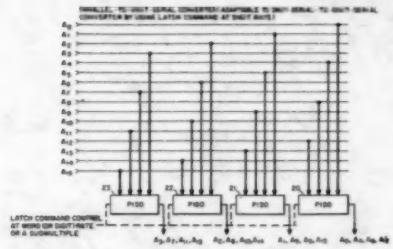
**Richard I. Hartley, Schenectady, N.Y.; Peter F. Corbett, Princeton, N.J.; Fathy F. Yassa, and Sharbel E. Noujaim, both of Clifton Park, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation-in-part of Ser. No. 204,792, Jun. 10, 1988, abandoned. This application May 4, 1989, Ser. No. 347,860**
**Int. Cl.[5] H03M** *9/00*
**U.S. Cl. 341—101** **16 Claims**

1. Apparatus for converting parallel data into digit-serial data having words each n bits wide into digit-serial data wherein each digit is m bits wide, m being an integer and a submultiple of n, said apparatus comprising:

a plurality n in number of input lines identified by respective consecutive ordinal numbers zeroeth through $(n-1)^{th}$ respectively receptive of progressively more significant bits of each parallel data word supplied during each successive $(n/m)^{th}$ one of a succession of more frequently occurring clock intervals;

a plurality of parallel-in/serial-out registers, m in number, identified by respective consecutive ordinal numbers zeroeth through $(m-1)^{th}$, each said register having a respective (n/m)-bit input port for receiving a respective (n/m)-bit-wide input signal responsive to a respective load command, and each said register having a respective single-bit-wide output port from which stored data can be clocked serially a single bit each said clock interval;



means for concurrently applying the respective load commands of said plurality of parallel-in/serial-out registers; and

means for applying the zeroeth through $(m-1)^{th}$ bits of each said parallel data word to the least significant bit places of the input ports of the correspondingly numbered parallel in/serial out registers; and for applying each progressively higher numbered bit of each said parallel data word beyond the $(m-1)^{th}$ to the next more significant bit place of the input port of the same parallel-in/-serial-out register receiving the bit numbered (n/m) lower, whereby said digit-serial data m bits wide are supplied from the single-bit-wide input ports of said plurality of parallel-in/serial-out registers.

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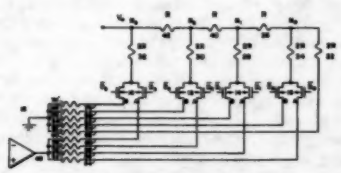
**4,942,397**

## ELIMINATION OF LINEARITY SUPERPOSITION ERROR IN DIGITAL-TO-ANALOG CONVERTERS

**Peter Real, North Andover, Mass., assignor to Signal Processing Technologies, Inc., Colorado Springs, Colo.**

**Filed Jul. 26, 1988, Ser. No. 224,517**
**Int. Cl.[5] H03M *1/06***
**U.S. Cl. 341—118** **9 Claims**



1. Converting means for converting digital signals each representing one of n digits in a number in a sequence of numbers if such sequence is provided to the converting means at control inputs thereof, the converting means converting such digital signals into a corresponding analog signal to be provided at a voltage output of the converting means, the analog signal being comprised of a sum of selected fractions of a first reference voltage if provided at a first voltage reference terminating region of the converting means which is adapted to be electrically connected to a first voltage reference source, the converting means comprising:

an R-2R resistive network, electrically connected to the voltage output, having a first plurality of resistances each with first and second terminating regions and each of substantially a first resistance value, this first plurality of resistances having each member thereof electrically connected in series with one another at such terminating regions, and with the R-2R resistive network also having a second plurality of resistances each with first and second terminating regions such that the first terminating region of each is electrically connected to a terminating region of at least one member of the first plurality of resistances and each having substantially a second resistance value;

a plurality of switching means each consisting of a switch output and first, second, third and fourth switch inputs such that signals on the third and fourth inputs of each can selectively electrically connect one of the first and second inputs thereof to the output thereof, the switch output of each being electrically connected to a second terminating region of a corresponding one of the second plurality of resistances, the third and fourth switch inputs of each being electrically connected to selected ones of the converting means control inputs;

a plurality of conductive first interconnecting means each electrically connecting a first switch input of one of the plurality of switching means to the first voltage reference terminating region by separately extending therebetween; and

a plurality of conductive second interconnecting means each electrically connecting a second switch input of one of the plurality of switching means to a second voltage reference terminating region, adapted for electrical connection to a second reference voltage source, by separately extending therebetween.

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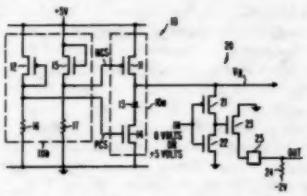
**4,942,398**

## DIGITAL SIGNAL TRANSLATOR HAVING COMPENSATION FOR P-CHANNEL AND N-CHANNEL THRESHOLD VOLTAGE SHIFTS

**LuVerne R. Peterson, San Diego, Calif., assignor to Unisys Corporation, Blue Bell, Pa.**

**Filed Mar. 21, 1989, Ser. No. 326,596**
**Int. Cl.[5] H03M *5/04***
**U.S. Cl. 341—118** **12 Claims**



1. A digital translator on a semiconductor chip that contains N-channel transistors and P-channel transistors which have threshold voltages that vary about respective nominal values; said translator including an input/output module which is made of said transistors and which receives a digital input signal having two input voltage levels and in response generates a digital output signal having two different output voltage levels; wherein to avoid shifts in said output voltage levels due to said threshold variations said translator further includes:

a voltage generator means which produces a reference voltage and sends it to said input/output module;

said generator including a circuit of said N-channel transistors and said P-channel transistors for varying said refer-

ence voltage in proportion to the threshold voltage of said N-channel transistors regardless of how the threshold voltage of said P-channel transistors varies;

said input/output module including an output transistor which is one of said N-channel transistors; and, a means for coupling said reference voltage to said output transistor when said input signal is at one of said two input voltage levels and for otherwise coupling a fixed bias voltage thereto;

said output transistor being adapted to produce said output signal by conducting in proportion to said reference voltage when that voltage is received, and by not conducting when said bias voltage is received.

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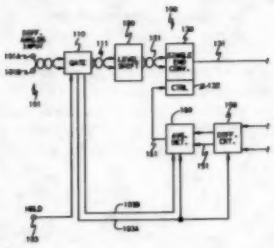
**4,942,399**

## ADAPTIVE FLASH ANALOG/DIGITAL CONVERTER FOR DIFFERENTIAL INPUT SIGNAL

**Timothy C. Buchholtz; Michael R. Gruver; Raymond A. Richetta, all of Rochester, and Timothy J. Schmerbeck, Kasson, all of Minn., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Mar. 15, 1989, Ser. No. 324,267**
**Int. Cl.[5] H03M 1/36**
**U.S. Cl. 341—143** **9 Claims**



1. A circuit for converting a differential analog input signal to a coded digital output signal, comprising:

a level shifter for shifting the level of said differential input signal with respect to a ground potential;

converter means coupled to said level shifter for converting said differential input signal to a single-ended analog signal referenced to said ground potential, said converter means including control means for varying the level of said single-ended analog signal with respect to said ground potential in response to a control signal such that an average value of said single-ended analog signal always corresponds to a zero value of said differential analog input signal;

a reference generator for producing a plurality of reference signals between constant upper and lower reference values, one of said reference signals being a midpoint value between said upper and lower values;

differencing means coupled to said converter means and to said reference generator for producing a difference signal representing the difference between said single-ended analog signal and said one reference signal having said midpoint value;

an average detector coupled to said differencing means and to said converter means for determining and storing an average value of said difference signal, and for producing said control signal representing said average value;

comparator means comprising a plurality of individual comparators each receiving said single-ended analog signal and a different one of said reference signals, said comparator means producing simultaneously a plurality of uncoded digital signals representing said shifted analog input signal, at least a particular one of said digital signals always representing a zero value of said differential analog input signal.

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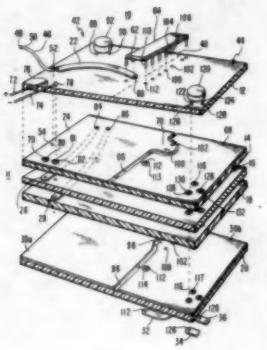
**4,942,400**

## ANALOG TO DIGITAL CONVERTER WITH MULTILAYER PRINTED CIRCUIT MOUNTING

**Richard J. Tarzalski, Magnolia, and Richard C. Hwang, Mt. Laurel Township, Burlington County both of N.J., assignors to General Electric Company, Moorestown, N.J.**

**Filed Feb. 9, 1990, Ser. No. 478,102**
**Int. Cl.[5] H03M 1/36; H01R 9/00**
**U.S. Cl. 341—155** **4 Claims**



1. An analog-to-digital converter arrangement, comprising:

a six-layer printed-circuit board, said printed-circuit board defining a broad region upon which components may be mounted, said broad region being divided into separate analog and digital portions having limited overlap, a first layer of said printed-circuit board defining analog signal-carrying paths, a second layer of said board defining an analog ground plane underlying said analog portion of said broad region and said first layer, third and fourth layers of said board being arranged with paths for carrying operating power to components mounted on said board, a fifth layer of said board defining a digital ground plane underlying said digital portion of said broad region, and a sixth layer of said printed-circuit board defining digital signal carrying paths;

an analog-to-digital converter integrated circuit including a plurality of interface pins mounted in said printed-circuit board, said pins including at least one analog ground pin and one digital ground pin, at least one analog signal input voltage pin, and plural digital output pins, said integrated circuit being mounted adjacent said overlap, with said analog signal input voltage pin making electrical contact only with one of said paths of said first layer, with said plural digital output pins making contact only with corresponding ones of said digital signal carrying paths, and with said analog and digital ground pins extending through said board and contacting both said analog and digital ground planes, whereby connection between said analog and digital ground planes occurs only in a region near said analog and digital ground pins;

energizing power conditioning means mounted on said board and making electrical contact only with said paths of said third and fourth layers for receiving power, and for conditioning said power, and for applying conditioned power to at least said integrated circuit for energization thereof; and

differential driving means coupled to said digital signal carrying paths and to said digital ground plane and adapted to be coupled to an off-board load, for receiving

said digital signals from said integrated circuit by way of said digital signal carrying paths, and for generating differential signals in response to said digital signals, for thereby avoiding the need to make connection to said digital ground plane in order to utilize said digital signals.

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**4,942,401**

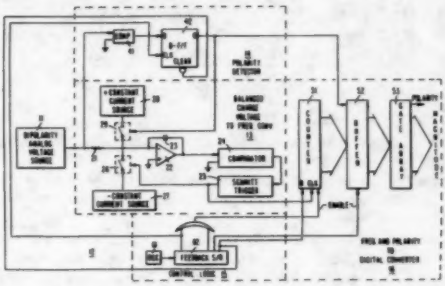
## ANALOG TO DIGITAL CONVERSION WITH CHARGE BALANCED VOLTAGE TO FREQUENCY CONVERTER HAVING POLARITY RESPONSIVE OFFSET

**Bill Gessaman, Everett; Paul Lantz, and Jon Parle, both of Seattle, all of Wash., assignors to John Fluke Mfg. Co., Inc., Everett, Wash.**

**Filed Feb. 24, 1989, Ser. No. 314,904**

**Int. Cl.[5] H03M *1/60***

**U.S. Cl. 341—157** **13 Claims**



1. A circuit for converting an input voltage having first and second opposite polarities to an output frequency wherein the output frequency is related to the value of the input voltage, the input voltage value including zero, the output frequency having a non-zero value for a zero input value, comprising

a capacitor;

means responsive to the input voltage for cyclically charging the capacitor in first and second opposite directions so that zero net charge is applied to the capacitor during each cycle, the means for charging including means for charging the capacitor (a) in the first direction at a first rate determined by the value of the input voltage and a predetermined current while the input voltage has the first polarity, (b) in the second direction at a second rate determined by the value of the input voltage while the input voltage has the first polarity, (c) in the first direction at a third rate determined by the value of the input voltage, a predetermined voltage and the predetermined current while the input voltage has the second polarity and (d) in the second direction at a fourth rate determined by the value of the input voltage, the predetermined voltage while the input voltage has the second polarity, the predetermined voltage and predetermined current being of opposite polarity; and

means responsive to the charging and discharging of the capacitor for deriving the output frequency.

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**4,942,402**

## RADIATION ABSORBER AND METHOD OF MAKING IT

**Brian E. Prewer, and Brian Milner, both of Wells, England, assignors to Thorn Emi Electronics Limited, Hayes, England**

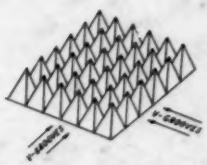
**Filed Oct. 26, 1988, Ser. No. 262,798**

**Claims priority, application United Kingdom, Oct. 27, 1987, 8725110**

**Int. Cl.[5] H01Q *17/00***

**U.S. Cl. 342—1** **4 Claims**

1. A radiation absorber designed to absorb radiation in the frequency range 0.5–2.5 THz comprising a body of cured, electrically insulating, silicone-based elastomer containing a n inert, electrically insulating, powdered siliceous filler, the surface of said absorber exposed to the radiation being profiled to enhance the absorption of said radiation by said absorber and thus to reduce the reflectivity of said absorber to said radiation in the said frequency range, wherein said electrically



insulating silicone-based elastomer comprises a room temperature polymerising aromatic/aliphatic hydrocarbon substituted polysiloxane.

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**4,942,403**

## PHASED-ARRAY RADAR

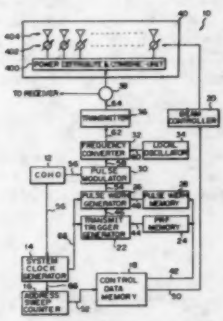
**Hiroshi Yokoyama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Dec. 8, 1988, Ser. No. 281,395**

**Claims priority, application Japan, Dec. 11, 1987, 62-313289**

**Int. Cl.[5] H01Q *3/22*; G01S *13/00***

**U.S. Cl. 342—372** **5 Claims**



1. A phased-array radar capable of electronically directing a directional beam of an antenna in any of N different directions, i.e., direction $\theta_1$ to direction $\theta_N$, comprising:

transmit trigger selector means responsive to a control signal for selectively setting a high transmit repetition frequency and a low transmit repetition frequency;

beam direction control means responsive to a direction command signal for directing the directional beam of said antenna in a designated direction; and

radar control means for generating the control signal and the direction command signal;

said radar control means controlling said transmit trigger selector means and said beam direction control means such that when the low transmit repetition frequency is selected, the directional beam is directed in one direction for a predetermined period of time and then continuously directed in a plurality of different directions for a predetermined period of time each at the high transmit repetition frequency;

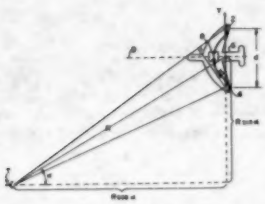
said radar control means repeating said procedure to command the directions $\theta_1$ to $\theta_N$ at the low transmit repetition frequency while commanding the directions $\theta_1$ to $\theta_N$ a plurality of times each at the high transmit repetition frequency.

**4,942,404**

## PASSIVE DOPPLER DIFFERENTIAL RANGING SYSTEM AND METHOD

**Marvin S. Kefer, Massapequa, N.Y., assignor to AIL Systems, Inc., Deer Park, N.Y.**

**Filed Jul. 18, 1989, Ser. No. 381,763**
**Int. Cl.[5] G01S 5/02, 3/52**
**U.S. Cl. 342—418** **2 Claims**



1. A method for use on an aircraft for determining the range, R, of a threat passively, which comprises the steps of:

mounting a first receiving antenna and a second receiving antenna on an aircraft and positioning the first and second antennas a known distance, d, apart from each other;

determining a first azimuth angle α of the threat with respect to the aircraft at a first time $t_o$, the azimuth angle o being defined as the angle of the threat from the direction of motion of the aircraft taken in a two-dimensional plane at the first time $t_o$;

determining a first differential doppler phase shift, Δϕ, between the first and second antennas of a received signal transmitted by the threat, using the equation:

$$\Delta\phi = \frac{2\pi d}{\lambda} \cdot \sin\alpha$$

$$\text{where } \lambda = \frac{\text{speed of light}}{\text{frequency of the received signal transmitted by the threat}}$$

measuring the velocity, v, of the aircraft;

determining a second differential doppler phase shift, $\Delta\phi_1$, at time $t_1$ between the first and second antennas of a received signal transmitted by the threat, using the equation:

$$\Delta\phi_1 = \frac{360 \cdot d}{\lambda} \sin\left(\tan^{-1}\left[\frac{R\sin\alpha}{R\cos\alpha} - v\Delta t\right]\right)$$

$$\text{where } \Delta t = t_1 - t_o$$

where $\Delta t = t_1 - t_o$

determining the differential differential doppler phase shift, ΔΔϕ, by subtracting the first differential doppler phase shift, Δϕ, from the second differential doppler phase shift, $\Delta\phi_1$; and

determining the range, R, of the threat at time $t_1$ by using the following equation:

$$R = \frac{v\Delta t}{\cos\alpha - \dfrac{\sin\alpha}{\tan\left[\sin^{-1}\left(\dfrac{\Delta\Delta\phi \cdot \lambda}{360 \cdot d} + \sin\alpha\right)\right]}}$$

-continued

where $\Delta t = t_1 - t_o$

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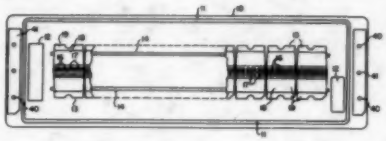
**4,942,405**

## LIGHT EMITTING DIODE PRINT HEAD ASSEMBLY

**Jospeh W. Dody, Mountain View; Richard J. Klinke, Sunnyvale; Christopher A. Lowery, Fremont; Vera D. Vallentin-Price, Sunnyvale; Gary D. Sasser, and William P. Sullivan, both of San Jose, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

**Filed Oct. 11, 1988, Ser. No. 256,001**
**Int. Cl.[5] G01D 9/42, 9/00; H01L 27/15, 33/00**
**U.S. Cl. 346—107 R** **13 Claims**



1. A method for assembling a row of LED dice on a print head comprising the steps of:

placing a row of the LED dice on the front face of a flat tile with the cleaved edges a predetermined distance from one lateral edge o the tile;

adhesively bonding to the dice to the front face of the tile with the LED faces of the dice substantially coplanar;

placing a row of tiles with the front face of each tile on a planar fixture and with one lateral edge of each tile against a linear fixture; and

adhesively bonding a mother plate to the back face of the row of tiles while on the fixture.

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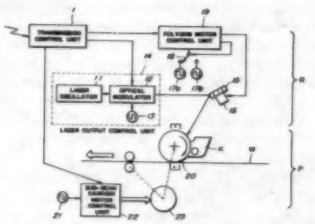
**4,942,406**

## LASER PRINTER WITH CLOCK POLYGON CONTROL FOR INCHES AND MILLIMETERS

**Yukio Tsuda, Musashino, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 26, 1988, Ser. No. 248,844**
**Claims priority, application Japan, Sep. 29, 1987, 62-242644**
**Int. Cl.[5] B41J 2/44; G01D 15/14; G02B 26/08**
**U.S. Cl. 346—108** **4 Claims**



1. A laser printer with clock generator polygon control for inches and millimeters, comprising:

a laser generator for generating laser light;

a light modulator for modulating the laser light in response to input picture image information, the laser light being generated by the laser generator at a speed corresponding to a density of scanning lines in an inch system;

a recording unit having a photosensitive drum rotating at a constant speed corresponding to the density of the scanning lines in the inch system for forming a latent picture

image thereon in response to light from said light modulator incident thereon and for printing a developed latent picture image onto a printing paper;

a polygon mirror for reflecting and scanning the laser light modulated by the light modulator onto the photosensitive drum so as to form a picture image corresponding to the latent picture image on the photosensitive drum;

a first clock generator for setting a rotation speed of the polygon mirror to a first rotation speed corresponding to the density of the scanning lines in the inch system;

a second clock generator for setting the rotation speed of the polygon mirror to a rotation speed which is reduced by a predetermined ratio from the first rotation speed; and

switching means for selecting one of the first and the second clock generators in accordance with a density of the scanning lines of the picture image information, the switching means selecting the first clock generator when the picture image information has a density of scanning lines in the inch system and the second clock generator when the picture image information has a density of scanning lines in a millimeter system.

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**4,942,407**

## SCANNING TYPE IMAGE RECORDING APPARATUS

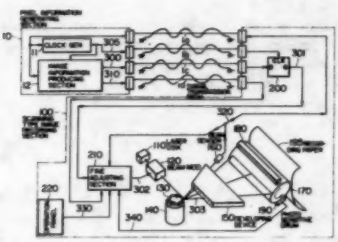
**Hiroyuki Tadokoro, Hitachi, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 3, 1989, Ser. No. 416,497**

**Claims priority, application Japan, Oct. 5, 1988, 63-249867**

**Int. Cl.[5] G01D *15/14***

**U.S. Cl. 346—108** **13 Claims**



1. A scanning type image recording apparatus in which an electrostatic latent image is formed onto a recording medium by clock signal generating means for generating a clock signal, pixel signal generating means for generating a time sequential pixel signal synchronously with the clock signal, modulating means for modulating a light beam in accordance with the time sequential pixel signal; scanning means for deflecting the light beam and scanning the recording medium, and start point detecting means which is provided over a scanning line of the light beam deflected by said scanning means and feeds back scan start timing information to said clock signal generating means and said pixel signal generating means and, said electrostatic latent image is developed by developing means, said scanning type image recording apparatus further comprising:

input means for indicating a fine adjustment value of a pulse width of said time sequential pixel signal;

scanning position control means for discriminating that the scanning line of the optical beam does not exist on the recording medium on the basis of the scan start timing information from said start point detecting means; and

pulse width fine adjusting means for setting a pulse width fine adjustment value in accordance with an indication of said input means during the discrimination of said scanning position control means and for outputting a final pixel signal which is obtained by finely adjusting the time sequential pixel signal to said modulating means.

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**4,942,408**

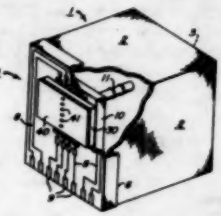
## BUBBLE INK JET PRINT HEAD AND CARTRIDGE CONSTRUCTION AND FABRICATION METHOD

**Hilarion Braun, Xenia, Ohio, assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Apr. 24, 1989, Ser. No. 342,135**

**Int. Cl.[5] B41V *2/05, 2/175***

**U.S. Cl. 346—140 R** **8 Claims**



1. A bubble jet print cartridge of the normal drop ejection kind comprising:

(a) an ink housing including an enclosed ink reservoir region and an ink supply and distribution wall member having (i) top and bottom surfaces and (ii) ink passage means extendng from a central region of said bottom wall surface, covering said reservoir region, to an outlet(s) on the outer periphery of said top surface of said wall member;

(b) a drop ejection chip comprising a continuous substrate having resistive heater elements and electrode leads supported on an upper surface thereof, the lower surface of said substrate being attached to said wall member top surface with a peripheral chip edge(s) adjacent, but not covering, said ink outlets(s);

(c) a raised ink barrier fence formed on the upper surface of said wall member and said upper chip surface to surround said heater elements of said chip and said ink outlet(s), said fence having a height extending above the top surface of said supported chip; and

(d) an orifice plate member affixed at its periphery to the top of said barrier fence.

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**4,942,409**

## DROP-ON-DEMAND PRINTHEAD

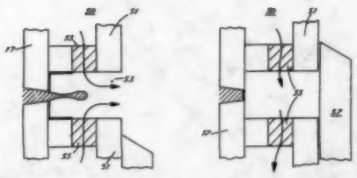
**Anthony D. Paton, The Thatched Cottage, 51 Mills Lane, Longstanton St. Michael, Cambridge; Stephen Temple, 66 Girton Road, Cambridge, CB3 0IN, and Mark R. Shepherd, 116 King James Way, Royston, Hertfordshire, SG8 7EF, all of England**

**Filed Apr. 28, 1989, Ser. No. 345,610**

**Claims priority, application United Kingdom, Apr. 29, 1988, 8810241**

**Int. Cl.[5] G01D *15/18*; B41J *2/04, 2/14, 2/155***

**U.S. Cl. 346—140 R** **6 Claims**



1. A drop-on-demand ink drop printhead for selectively printing drops of ink in a print line on a web or sheet movable relatively to the printhead, comprising a body formed with a series of parallel directed ink channels, respective ink ejector

apertures formed in a row at corresponding ends of said channels, means for ejecting ink drops from said channels through said ejector apertures, a housekeeping manifold fitted to the ejector aperture ends of the ink channels and extending alongside the row of ink ejector apertures, said manifold comprising a pair of parallel, spaced walls defining a trench extending therebetween through which ink drops from said apertures are discharged, said walls separating said manifold into upper and lower parts and each including a plurality of openings connecting said upper and lower manifold parts with said trench and duct means for supplying environmental fluids to or exhausting such fluids from the region of said ejector apertures by way of said trench, said openings and said upper and lower manifold parts.

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**4,942,410**

**TONER RECEPTIVE COATING**

**John J. Fitch, Natick, and Tim Parker, Shrewsbury, both of Mass., assignors to Dennison Manufacturing Company, Framingham, Mass.**

**Filed Jul. 6, 1989, Ser. No. 376,888**
**Int. Cl.[5] G01D *15/00***
**U.S. Cl. 346—160.1** **23 Claims**

1. A toner receptive coating for paper substrates and polymeric film substrates for use in receiving pressure transferred toned images from printers and electrostatic copiers employing dry magnetic toners, said toner receptive coating comprising:

a blend of particulate fillers comprising particulate mineral filler and a particulate polymeric wax filler, and a polymeric binder for the blend of particulate fillers,

said particulate mineral filler having the property of securing said dry toner particles and restraining their mobility, and said mineral filler reducing coating tack to prevent the coating from sticking to the underside of the substrate if the substrate is unwound from a roll, and said particulate polymer wax filler having the property of imparting lubricity to the coating so that the dry magnetic toned images transferred to the coating will not substantially rub off onto adjacent portions of the coating on the substrate if the transferred toned image is rubbed or abraded.

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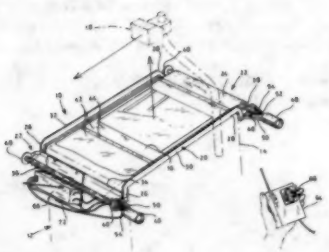
**4,942,411**

**AUTOMATIC OVERLAY FEED APPARATUS FOR AN OVERHEAD PROJECTOR**

**Steve A. Polston, 424 Ferret Rd., Knoxville, Tenn. 37922**

**Filed Jun. 27, 1988, Ser. No. 211,856**
**Int. Cl.[5] G03B *1/04, 23/12***
**U.S. Cl. 353—26 R** **2 Claims**



1. An automatic overlay feed apparatus for automatically feeding projectable overlays to the object area of an overhead projector, said apparatus utilizing an overlay scroll having first and second end portions and defining a plurality of projectable overlays sequentially arranged from said first end portion to said second end portion, said apparatus comprising:

a frame for being supported on said projector, said frame having a first end portion and a second end portion;

overlay scrolling means for selectively moving said projectable overlays into position on said object area, said scrolling means including a first winding shaft rotatably mounted on said frame for engaging said first end portion of said overlay scroll and for windably receiving said overlay scroll, and a second winding shaft rotatably mounted on said frame in a position selectively spaced from, and in substantially parallel alignment with, said first shaft for engaging said second end portion of said scroll, whereby as said frame is selectively positioned on said projector, and as said scroll is windably received by said first and second winding shafts, a selected portion of said scroll extending between said first and second winding shafts overlays said object area of said projector;

motor means for selectively rotating said first and second winding shafts, said motor means including a first motor for selectively rotating said first winding shaft and a second motor for selectively rotating said second winding shaft, each said first and second motor having a drive shaft;

a first electromagnetically actuated clutch coupling for connecting said drive shaft of said first motor with said first winding shaft whereby said first winding shaft can be selectively disengaged to rotate independently from said drive shaft, said clutch coupling including an armature member mounted on said drive shaft of said first motor, a rotor member mounted on said first winding shaft, and a field member for being electromagnetically charged by a suitable power source, said field member being mounted on said frame in close proximity to said rotor member, whereby the selective electromagnetic charging of said field member electromagnetically charges said rotor member whereupon said rotor member attracts and engages said armature member such that said drive shaft serves to rotate said first winding shaft; and

a second electromagnetically actuated clutch coupling for connecting said drive shaft of said second motor with said second winding shaft, whereby said second winding shaft can be selectively disengaged to rotate independently from said drive shaft of said second motor, said clutch coupling including an armature member mounted on said drive shaft of said second motor, a rotor member mounted on said second winding shaft, and a field member for being electromagnetically charged by a suitable power source, said field member being mounted on said frame in close proximity to said rotor member, whereby the selective electromagnetic charging of said field member electromagnetically charges said rotor member whereupon said rotor member attracts and engages said armature member such that said drive shaft serves to rotate said second winding shaft.

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**4,942,412**

**FORMING MULTIPLE EXPOSURES ON SINGLE FILM SHEETS, IN A FILM PACK**

**Alton D. Wheeler, 3940 Fox Meadow La., Pasadena, Tex. 77504**

**Filed Nov. 7, 1988, Ser. No. 267,836**
**Int. Cl.[5] G03B *1/00***
**U.S. Cl. 354—125** **22 Claims**

1. In a camera having a photographic film pack reception zone from which film prints are ejected after film exposure, the combination comprising:

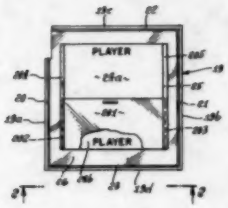
(a) first means providing for timewise separated exposures of different sections of an in-place film, in said zone, and

(b) second means to allow ejection of the in-place film only after completion of said exposures of said different sections of the in-place film,

(c) said first means including template means having different zones for passing light corresponding to said separated exposures, respectively,

(d) the photographic film being carried by carrier structure including a frame bounding a light passing zone,

(e) the template means being in the form of a locally transparent, generally planar and rectangular sheet adapted to pass an image to be reproduced on the film,




(f) the template means having multiple elongated ribs integral with said sheet, and projecting outwardly from the plane of the sheet,

(g) said multiple ribs substantially bounding said different light passing zones to block light access to said zones in directions parallel and proximate to the plane of the sheet.

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**4,942,413**

**CAMERA**

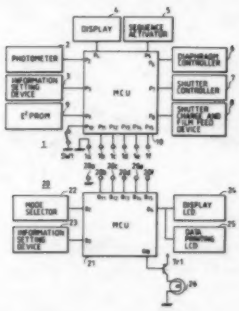
**Takashi Saegusa, Kawasaki; Tetsuro Goto, Chiba, and Seiichi Yasukawa, Kawasaki, all of Japan, assignors to Nikon Corporation, Tokyo, Japan**

**Filed May 19, 1989, Ser. No. 354,397**

**Claims priority, application Japan, May 26, 1988, 63-129029; May 27, 1988, 63-129573; May 30, 1988, 63-71340[U]**

**Int. Cl.[5] G03B 1/12**

**U.S. Cl. 354—173.11** **6 Claims**




1. A film winding device comprising:

first timer means for measuring a first time associated with a data printing operation;

second timer means for measuring a second time associated with a shutter;

logical sum means for receiving signals output from said first and second timer means, discriminating whether or not both said first and second timer means output completion signals, and changing its output on the basis of the discrimination result; and

film winding means for detecting a change in output from said logical sum means to start a film winding operation.

**4,942,414**

**FRONT CONVERSION ADAPTER FOR LENS SHUTTER TYPE OF ZOOM LENS CAMERA**

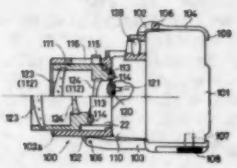
**Norimichi Takahashi; Hitoshi Tanaka, and Koichi Maruyama, all of Tokyo, Japan, assignors to Asahi Kogaku Kogyo Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 15, 1988, Ser. No. 244,789**

**Claims priority, application Japan, Sep. 17, 1987, 62-233330**

**Int. Cl.[5] G03B 13/32**

**U.S. Cl. 354—195.12** **18 Claims**



1. A front conversion adapter adapted to be attached to a front face of a lens shutter type of camera having a photographing optical system having a zoom lens, and a finder optical system separate from the photographing optical system, wherein a lens frame of the photographing optical system is adapted to be moved in accordance with the zooming operation, wherein said front conversion adapter comprises an adapter body which can be attached to a camera body of an associated lens shutter type of camera, and a conversion optical system which is located in front of the photographing optical system and which is adapted to move in the optical axis direction of the photographing optical system in order to change the focal length of the photographing optical system, said conversion optical system being supported by an adapter lens frame so as to move in the optical axis direction in association with movement of the lens frame of the photographing optical system of the camera body, and in accordance with said zooming operation in at least a part of the focal length area.

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**4,942,415**

**SHUTTER FOR A PHOTOGRAMMETRIC CAMERA**

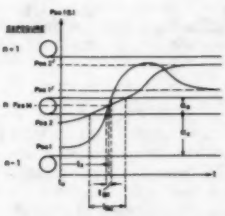
**Karl Felle, and Heinz Krastel, both of Oberkochen, Fed. Rep. of Germany, assignors to Carl-Zeiss-Stiftung, Heidenheim/Brenz, Fed. Rep. of Germany**

**Filed Aug. 30, 1989, Ser. No. 400,686**

**Claims priority, application Fed. Rep. of Germany, Nov. 5, 1988, 3837682**

**Int. Cl.[5] G03B 7/00, 9/20**

**U.S. Cl. 354—234.1** **7 Claims**



1. A shutter for a photogrammetric camera comprising:

rotatably mounted disc means for defining a shutter opening;

drive means for rotatably driving said disc means for each exposure operation by accelerating said disc means out of a standstill start position thereof;

angle encoder means for mensuring said start position of said disc means;

a control circuit for providing a signal indicative of a desired exposure time $t_E$; and,

a device operatively connected to said drive means for displacing said start position of said disc means in dependence upon said signal so as to cause the access time $t_E$ between the start $t_0$ of the acceleration and the exposure for different adjustable exposure times ($t_{E1}$, $t_{E2}$) to have a substantially constant value.

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**4,942,416**

**PROCESSING SOLUTION FILTERING DEVICE HAVING A FILTER IN A PROCESSING SOLUTION CONTAINER**

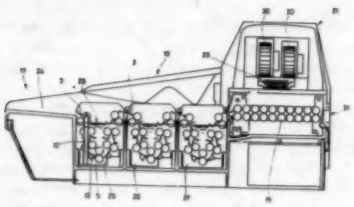
**Yasuhito Yoshimi, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan**

**Filed Dec. 19, 1988, Ser. No. 286,518**

**Claims priority, application Japan, Dec. 19, 1987, 62-193275**

**Int. Cl.[5] G03B** *3/06*

**U.S. Cl. 354—299** **15 Claims**



1. A method of easily replacing a filter within a photosensitive material processing system without leakage, said method comprising:

providing a container holding photosensitive material processing solution, the container having a processing solution inlet and a processing solution outlet and a bottom surface, the processing solution extending in the container from said bottom surface to an upper surface of said processing solution along a depth dimension, said outlet being formed on the bottom surface of said container;

providing a filter in said container, said filter having an upper portion located above the upper surface of said processing solution and said filter extending to said outlet, said filter being disposed in said container so that it extends substantially along the entirety of said depth dimension;

removing the filter from the outlet of the container which is full of photosensitive material processing solution by gripping and manipulating the upper portion of said filter;; and

attaching a replacement filter to said outlet of said container by gripping and manipulating an upper portion of said replacement filter, said upper portion of said replacement filter being located above said surface of said photosensitive material processing solution.

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**4,942,417**

**POWERED ZOOM CAMERA**

**Azuma Miyazawa, Mitaka, and Atsushi Maruyama, Yokohama, both of Japan, assignors to Olympus Optical Co., Ltd., Japan**

**Filed Jun. 23, 1989, Ser. No. 370,631**

**Claims priority, application Japan, Jun. 24, 1988, 63-157454**

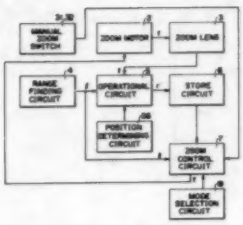
**Int. Cl.[5] G03B** *13/36*

**U.S. Cl. 354—400** **24 Claims**

1. A powered zoom camera comprising:

a zoom lens;

mode selecting means for selecting one of a manual zoom mode in which the focal length of the zoom lens is manually selected by the actuation of an actuation member disposed so as to be accessible from the exterior of the camera and an automatic zoom mode in which a magnification of the size of the image of an object to be photographed on a focal plane of the camera with respect to the size of a film frame is kept constant in response to a distance or range between the object and the camera lens; and




lens drive control means for operating the zoom lens at a low speed when the manual zoom mode is selected and for operating the zoom lens at a high speed when the automatic zoom mode is selected.

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**4,942,418**

**FOCUS CONDITION DETECTING DEVICE**

**Toshio Norita, Sakai; Tokuji Ishida, Daito; Masataka Hamada, Minamikawachi; Toshihiko Karasaki, Sakai, and Nobuyuki Taniguchi, Nishinomiya, all of Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

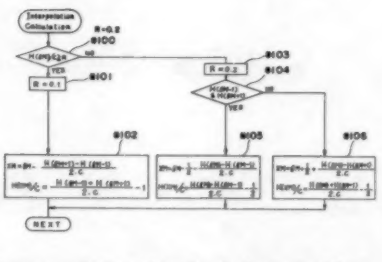
**Continuation of Ser. No. 231,075, Aug. 11, 1988, Pat. No. 4,835,562, which is a continuation of Ser. No. 14,923, Feb. 13, 1987, Pat. No. 4,768,054. This application May 22, 1989, Ser. No. 355,449**

**Claims priority, application Japan, Feb. 14, 1986, 61-31392; Mar. 5, 1986, 61-49060; Mar. 5, 1986, 61-49061; Mar. 5, 1986, 61-49062**

**The portion of the term of this patent subsequent to May 30, 2006, has been disclaimed.**

**Int. Cl.[5] G03B** *3/00*; **G01J** *1/20*

**U.S. Cl. 354—408** **2 Claims**




1. An automatic focus detection device, comprising:

an objective lens for forming displaced first and second images;

first and second image signal generating means, having first and second sensors positioned to receive the first and second images and adapted to generate first and second image signals corresponding to the light intensity distributions of the images on the first and second sensors, respectively;

correlation calculating means for calculating correlation between the first and second image signals while repeatedly shifting the second image signal relative to the first image signal by a given pitch to provide a correlation

value of each shift with the corresponding amount of each shift;

best correlation finding means for finding a best correlation among the plurality of calculated correlations to produce a best correlation value;

contract detecting means for detecting the contrast of one of the images on the first and second sensors;

interpolation detecting means for carrying out an interpolation calculation to find a true best correlation in accordance with the detected contrast and a correlation in front of and another correlation behind the best correlation along the shifting direction, and

focusing condition detecting means for detecting the focusing condition of the objective lens with respect to the object in accordance with the true best correlation.

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**4,942,419**

## IMAGE RECORDING APPARATUS

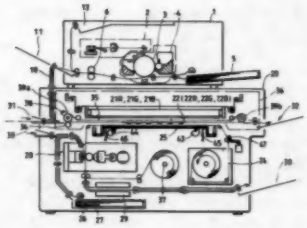
**Hitoshi Nakai, and Toshio Sakai, both of Nagoya, Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Nov. 14, 1988, Ser. No. 270,650**

**Claims priority, application Japan, Nov. 12, 1987, 62-287751; Jan. 12, 1988, 63-2310[U]**

**Int. Cl.[5] G03B *27/32***

**U.S. Cl. 355—27** **10 Claims**



1. An image recording apparatus comprising:

a light source for emitting light;

means for positioning a photosensitive recording medium for exposure to light from the light source;

means for providing mask sheets for the formation of mask images;

mask image forming means for forming sequential mask images on the mask sheets;

light transmissive and dielectric conveying means disposed between the light source and the photosensitive recording medium and having an outer mask sheet receiving surface for positioning the mask sheets having mask images thereon between light from the light source and the photosensitive recording means;

means for electrifying said conveying means to cause the conveying means to attach the mask sheets thereto;

means for exposing the photosensitive recording medium through mask images on a plurality mask of sheets conveyed by the conveying means for forming a completed image thereon;

means for conveying mask sheets from the mask image forming means to the conveying means; and

means for removing the mask sheets from the conveying means for discharge from the apparatus.--

**4,942,420**

## HEAT/PRESSURE APPLYING UNIT FOR COPYING APPARATUS

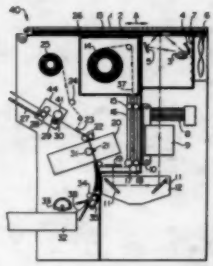
**Takashi Tomizawa, Aichi; Shigeyuki Hayashi, Nagoya; Motoshi Ohno, Nagoya; Takashi Nakata, Nagoya, and Yoichi Horaguchi, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan**

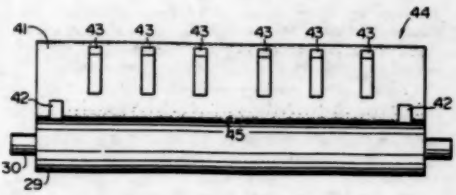
**Filed Jan. 23, 1989, Ser. No. 300,437**

**Claims priority, application Japan, Jan. 22, 1988, 63-7367[U]**

**Int. Cl.[5] G03B *27/32***

**U.S. Cl. 355—27** **14 Claims**






7. A copying apparatus for use with a photo and pressure sensitive recording medium and a developer sheet, which comprises:

original support means for supporting an original having carried thereon image information;

an optical system including a light source means for emitting light to shine upon the original, and optical means for directing the light reflected from the original, toward said recording medium to expose the same to the light thereby forming a latent image onto said recording medium, the latent image corresponding to said image information on the original;

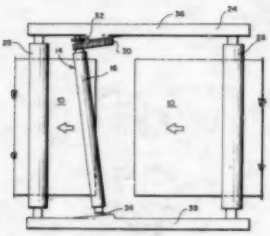
means for developing said latent image on said recording medium, onto said developer sheet to form an image corresponding to said latent image, onto said developer sheet; and

fixing means for fixing said image on said developer sheet, said fixing means comprising a pair or rollers cooperating with each other to define a nip therebetween, said developer sheet being caused to pass through said nip at which at least one of heat and pressure is applied to said developer sheet by said pair or rollers, and first and second stripper means associated with at least one of said pair of rollers, said first stripper means being arranged adjacent said nip for stripping said developer sheet from said at least one roller of said pair of rollers, while said second stripper means is arranged at a location spaced downstream from said first stripper means in the direction of rotation of said at least one roller along a peripheral surface of said at least one roller, for forcibly stripping said developer sheet from said at least one roller.

## 4,942,421
## METHOD OF PREVENTING BENDING OF LITHOGRAPHIC PRINTING PLATES

Robert Gumbinner, Tarrytown, N.Y., assignor to H. T. Products, Inc., Tarrytown, N.Y.

Filed Jul. 19, 1989, Ser. No. 382,888
Int. Cl.[5] G03D *3/08*
U.S. Cl. 355—27 7 Claims



1. Method of preventing bending of lithographic printing plates during processing comprising:
(a) exposing the printing plate;
(b) developing an exposed image by placing the exposed plate within a developing solution, then
(c) advancing the developed plate between a pair of rotating brushes mounted at an oblique angle with respect to the axis of said advancing, such that the trailing edge of said plate laterally incrementally contacts said brushes.

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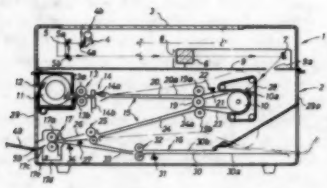
## 4,942,422
## IMAGE REPRODUCING DEVICE AND TRANSFER SHEET USED IN THE DEVICE

Harumitsu Mashiko; Shigeru Suzuki, both of Yokohama, and Takashi Seto, Ayase, all of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan

Filed May 20, 1988, Ser. No. 196,604
Claims priority, application Japan, May 22, 1987, 62-124008; May 29, 1987, 62-133941; Jun. 5, 1987, 62-139960; Jul. 10, 1987, 62-171272
Int. Cl.[5] G03B *29/00*
U.S. Cl. 355—28 49 Claims



1. An image reproducing device for reproducing an image of an original using a photosensitive film and a transfer material for receiving an image formed on said photosensitive film, comprising:
a scanning means for optically scanning a surface of an original, said surface being to be reproduced, in a predetermined direction, while generating sequentially light beams reflected from each of portions of said scanned surface;
a supply means for supplying said photosensitive film;
an exposure means for exposing said supplied photosensitive film, said exposure means comprising a pair of tension rollers and an exposure station, a pair of said tension rollers being adapted to rotate at a somewhat higher circumferential speed than a speed of said supplied photosensitive film so as to exert a tension on said supplied photosensitive film, said exposure station being situated in an image forming position of said generated light beams between said supply means and said tension rollers for exposing said supplied photosensitive film, and having a flat surface positioned at a height identical with or higher than a height of a straight line connecting a position of said photosensitive film supplied from said supply means with a nip of said tension rollers, said flat surface contacting with said supplied photosensitive film; and
a developing means for superposing said exposed photosensitive film on said transfer material and for spreading a developer between said superposed photosensitive film and said transfer material.

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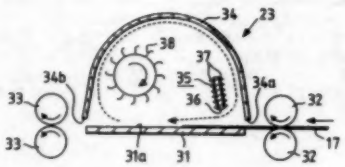
## 4,942,423
## SHEET HEATING DEVICE

Yumio Matsumoto, Kasugai; Yasuo Kimura, Ichinomiya, and Osamu Takagi, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Japan

Filed Oct. 24, 1989, Ser. No. 425,922
Claims priority, application Japan, Oct. 31, 1988, 63-142145[U]
Int. Cl.[5] G03B *27/52*
U.S. Cl. 355—30 3 Claims



1. A sheet heating device for heating a sheet which has a lateral length, the device comprising:
sheet transferring means for transferring the sheet in one direction, the sheet transferring means defining a sheet path;
a cover member disposed to cover the sheet path;
a heat generating member disposed within the cover member and extending in a direction substantially perpendicular to the traveling direction of the sheet; and
a hot air circulation means disposed within the cover member, the circulation means generating a hot air stream having a width at least equal to the lateral length of the sheet, and directing the hot air in the sheet traveling direction.

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## 4,942,424
## METHOD OF AND APPARATUS FOR PRINTING COLOR PHOTOGRAPH AS WELL AS COLOR FILTER FOR USE IN THE SAME APPARATUS

Takaaki Terashita, and Sethuo Okada, both of Kanagawa, Japan, assignors to Fuji Photo Film Co., Ltd., Kanagawa, Japan

Filed Jun. 9, 1988, Ser. No. 204,486
Claims priority, application Japan, Jun. 12, 1987, 62-146542; Jun. 12, 1987, 62-146543; Jul. 30, 1987, 62-146544; Aug. 11, 1987, 62-191187; Aug. 11, 1987, 62-200508; Aug. 11, 1987, 62-200509
Int. Cl.[5] G03B *27/80*
U.S. Cl. 355—38 16 Claims

1. A color photographic printing method of printing a color film on the basis of a measurement value measured by a light measuring device which has a spectral sensitivity distribution coinciding with or similar to a substantially effective spectral sensitivity distribution of red-sensitive, green-sensitive and blue-sensitive layers of a color paper, and which measures red

light, green light and blue light passing through the color film, emitted from a light source, and on the basis of the printing condition of a reference film type, comprising the steps of:

(a) calculating the common film characteristic of the type of a film to be printed;

(b) comparing the common film characteristic of said reference film type with the film characteristic of the type of said film to be printed; and

(c) correcting the printing condition of said reference film type on the basis of the result of the comparison in said Step (b) and calculating an amount of exposure for printing from said measurement value to thereby effect printing of said film.

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**4,942,425**

## MICROFILM IMAGE PROCESSING APPARATUS

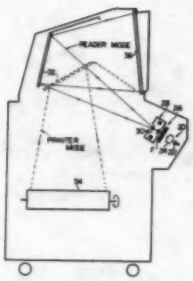
**Kuniaki Kamimura; Kenji Sawada, and Yasushi Yamade, all of Osaka, Japan, assignors to Minolta Camera Kabushiki Kaisha, Osaka, Japan**

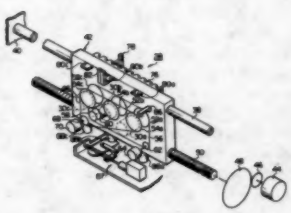
**Filed Dec. 23, 1988, Ser. No. 289,048**

**Claims priority, application Japan, Dec. 25, 1987, 62-332951**

**Int. Cl.[5] G03B *27/52*; G02B *7/16***

**U.S. Cl. 355—45** **15 Claims**





1. A microfilm image processing apparatus comprising

(a) an image viewing screen,

(b) a light receiving member,

(c) a source of light,

(d) microfilm retaining means held in position between said viewing screen and said source of light and operative to retain a microfilm strip therein,

(e) light projecting means positioned between said microfilm retaining means and said viewing screen for projecting toward said viewing screen or toward said light receiving means a beam of light emitted from said source of light and transmitted through an image-carrying microfilm strip retained in said microfilm retaining means, wherein said light projecting means comprises

(e/1) a plurality of projection lenses respectively having different magnifications,

(e/2) lens carrying means carrying said plurality of projection lenses,

(e/3) said lens carrying means being movable in opposite directions perpendicularly to the direction in which a beam of light is to be projected from said light projecting means,

(e/4) said plurality of projection lenses being arranged in an array in the direction of movement of said lens carrying means,

(f) an optical member disposed intermediate between said plurality of projection lenses and said viewing screen and movable between a first position to establish a path of light from one of said projection lenses toward said viewing screen and a second position to establish a path of light from one of said projection lenses toward said light receiving member,

(g) instructing means for generating an instruction signal effective to initiate said lens carrying means into movement,

(h) scan control means responsive to the instruction signal from said instructing means for moving said optical member to said second position thereof and initiating said lens carrying means into movement to scan the image on the microfilm strip retained in said microfilm retaining means and directing the resultant image-carrying beam of light toward said light receiving member through a slit aperture, and

(i) lens exchange means for determining the position of said lens carrying means in the direction perpendicular to the path of light from any one of said plurality of projection lenses when said optical member is held in said first position thereof.

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**4,942,426**

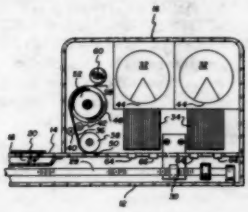
## COVER SHEET CLEANING MEANS FOR A CONTACT PRINTER

**Robert S. Jones, and John J. Maurer, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Nov. 17, 1989, Ser. No. 440,576**

**Int. Cl.[5] G03B *27/10***

**U.S. Cl. 355—84** **7 Claims**



1. In a contact printer which comprises means for supporting a film and an original in superposed relationship on a vacuum table, means for providing a source of light for exposing said

film through said original, means for moving said light over the surface of said superposed film and original, a substantially impervious flexible and transparent cover sheet carried by said light moving means arranged to cover said superposed film and original as said exposing light is scanned across said film and original whereby the vacuum is applied to said film and said original to remove air from therebetween as said film is exposed by said light through said cover sheet and said original, the improvement comprising means for contacting the surface of said cover sheet during use and removing dust and dirt thereon to assure that the optical path for the exposing light remains clear and unobstructed.

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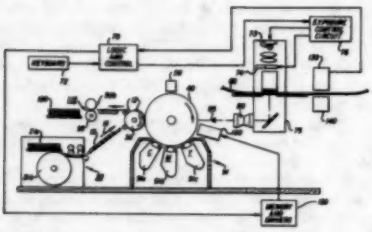
**4,942,427**

## METHOD AND APPARATUS FOR ANNOTATING ELECTROPHOTOGRAPHIC PRINTS OF PHOTOGRAPHIC NEGATIVES

**David M. Rakov, and Joseph A. Manico, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Aug. 9, 1989, Ser. No. 390,948**
**Int. Cl.[5] G03G *15/01***
**U.S. Cl. 355—202** **6 Claims**



1. Apparatus for annotating a color print of a photographic negative made by an electrophotographic printer having a photoconductor, comprising:

(a) means for scanning a negative to acquire density information relating to densities of different colors at positions within the negative;

(b) first exposure responsive to such density information for projecting light through the negative onto the photoconductor to form color separation electrostatic images on the photoconductor;

(c) second exposure means for projecting light onto the photoconductor selectively discharging the color separation electrostatic images to annotate the image; and

(d) logic and control means for controlling the second exposure means to effect the annotation in accordance with density information measured by the scanning means.

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**4,942,428**

## METHOD AND APPARATUS FOR ANNOTATING ELECTROPHOTOGRAPHIC PRINTS OF PHOTOGRAPHIC NEGATIVES

**David M. Rakov, and Joseph A. Manico, both of Rochester, N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

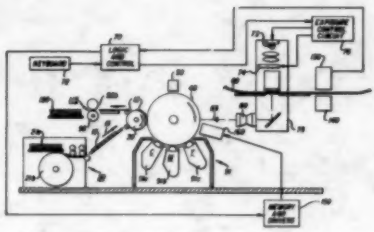
**Filed Aug. 9, 1989, Ser. No. 390,949**
**Int. Cl.[5] G03G *15/01***
**U.S. Cl. 355—202** **6 Claims**

1. Apparatus for annotating a color print of a photographic negative made by an electrophotographic printer having a photoconductor, comprising:

(a) means for scanning a negative to acquire density information relating to densities of different colors at positions within the negative;

(b) means responsive to such density information for projecting light through the negative onto the photoconductor to form color separation electrostatic images on the photoconductor;

(c) ion projection means for selectively depositing charge on the color separation electrostatic images to annotate the image; and



(d) logic and control means for controlling the ion projection means to effect the annotation in accordance with density information measured by the scanning means.

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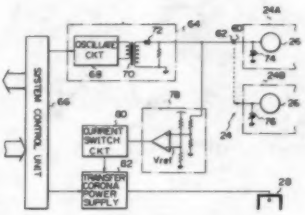
**4,942,429**

## IMAGE RECORDING APPARATUS WITH A REMOVABLE DEVELOPING UNIT

**Yohtaro Kakitani, Yokosuka, Japan, assignor to Ricoh Company, Ltd., Tokyo, Japan**

**Filed Nov. 28, 1988, Ser. No. 276,549**
**Claims priority, application Japan, Nov. 30, 1987, 62-302493**
**Int. Cl.[5] G03G *15/00, 15/01***
**U.S. Cl. 355—208** **7 Claims**




1. An image recording apparatus comprising recording means which includes at least a developing unit which is removably mounted on a body of said apparatus, said apparatus comprising:

power supply means installed in said body of said apparatus for feeding power to said recording means;

level adjusting means installed in said developing unit for producing a signal a level of which is changed on the basis of power which is generated by said power supply means in association with characteristics particular to a developer stored in said developing unit and is applied to said developing unit as a developing bias voltage; and

condition changing means for identifying the level of the signal outputted by said level adjusting means and, based on a result of identification, selectively changing at least one of a plurality of recording process factors.

## 4,942,430
## IMAGE RECORDING APPARATUS HAVING SEPARATED OPTICAL AND DEVELOPING UNITS

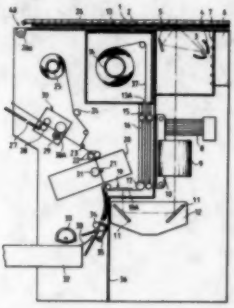
**Makoto Yamada, Gifu; Osamu Nagata, Aichi; Toshio Sugiura, Nagoya; Tsuyoshi Suzuki, Nagoya; Kazuhito Ishida, Nagoya; Eiji Shibata, Nagoya; Kazumasa Makino, Nagoya; Yoichi Horaguchi, Nagoya; Takashi Tomizawa, Aichi; Shigeyuki Hayashi, Nagoya; Motoshi Ohno, Nagoya, and Takashi Nakata, Nagoya, all of Japan, assignors to Brother Kogyo Kabushiki Kaisha, Aichi, Japan**

**Filed Dec. 8, 1988, Ser. No. 281,327**

**Claims priority, application Japan, Dec. 11, 1987, 62-189350[U]; Dec. 15, 1987, 62-191005[U]; Dec. 15, 1987, 62-191013[U]**

**Int. Cl.[5] G03G *15/04***

**U.S. Cl. 355—232** **10 Claims**



5. An image recording apparatus for recording an image on an imaging surface of an image recording medium, said image corresponding to an image of an original said apparatus comprising:

an original support member on which said original is mounted with its surface to be imaged facing downwardly;

an exposure unit having an exposure zone, said image recording medium passing along said exposure zone with said imaging surface facing down;

an optical system provided at a position between said original support member and said exposure zone; said optical system being provided with a single reflection unit and providing a first optical path directed vertically downwardly from said original support member, a second optical path directed horizontally, and a third optical path directed vertically upwardly, said second optical path being provided by said single reflection unit; and

a pair of frames for accommodating therein said exposure unit and said optical system, and wherein said reflection unit is vertically movably secured to said pair of frames.

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## 4,942,431
## IMAGE FORMING APPARATUS

**Tatsuya Tada, Kawasaki, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Aug. 25, 1989, Ser. No. 398,444**

**Claims priority, application Japan, Aug. 31, 1988, 63-214803; Aug. 31, 1988, 63-214806**

**Int. Cl.[5] G03G *21/00***

**U.S. Cl. 355—246** **12 Claims**

5. An image forming apparatus, comprising:

an image bearing member;

latent image forming means for forming a latent image on said image bearing member;

developing means for developing the latent image, including:

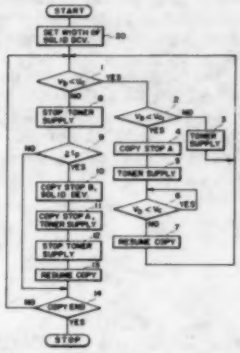
a developer container for containing a developer including carrier and toner particles;

a toner container for containing the toner particles;

toner supply means for supplying the toner particles from said toner container to said developer container;

a developer carrying member for carrying on its surface the developer supplied from said developer container;

a sensor for detecting a toner content in the developer, said apparatus further comprising:




control means for controlling the toner supply from said toner container to said developer container on the basis of an output of said sensor, wherein when a toner supply signal is not produced within a predetermined period of time, a predetermined latent image is formed on said image bearing member, and the predetermined latent image is developed by said developing means, said control means controls a quantity of the toner particles consumed by the development of the predetermined latent image.

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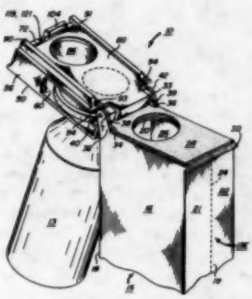
## 4,942,432
## APPARATUS FOR ADDING TONER TO AN ELECTROSTATOGRAPHIC DEVELOPMENT STATION

**Thomas W. Mort, Rochester; Philip A. Stern, Chili, and Scott W. Garner, Penfield, all of N.Y., assignors to Eastman Kodak Company, Rochester, N.Y.**

**Filed Jun. 28, 1989, Ser. No. 372,485**

**Int. Cl.[5] G03G *15/08***

**U.S. Cl. 355—260** **10 Claims**



1. Apparatus for adding toner from a toner container, which has a mouth opening, into a toner hopper at a development station of an electrostatographic copier or printer, the apparatus including:

(a) a top wall covering and sealing the interior of the hopper to the top, said top wall having a first opening therethrough, and said first opening being substantially the same size as the mouth opening of the toner container; and

(b) a pivotable member having (i) a first position away from said top wall of the toner hopper and a second position overlying said top wall of the toner hopper, (ii) means for non-slidably attaching a container of toner, (iii) a second opening therethrough for toner flow, and (iv) mounting means associated with the the hopper for mounting said pivotable member, said pivotable member being useful for holding and transporting an open container of toner between said first and second positions, and said first and second openings being such that when said pivotable member is in said second position, said first and second openings will automatically be fully aligned, thus enabling an attached container of toner to also be automatically in a position for toner therein to flow into such hopper, without any further retouching, regrasping or direct rehandling of such a container.

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**4,942,433**

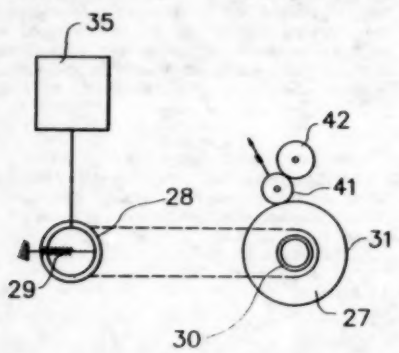
## FIXING METHOD AND APPARATUS

**Paul O. Stuart, Pittsford, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed May 15, 1989, Ser. No. 352,237**

**Int. Cl.[5] G03G *15/20, 21/00***

**U.S. Cl. 355—284** **9 Claims**




1. A process of fixing color toner images carried on a receiving sheet using a fixing device of the type having at least one roller having a surface which contacts the toner image during fixing, said process including the step of engaging said surface with a release liquid applying wick to apply release liquid thereto, said wick being of a type having an irregular fabric surface that is rotatable with the roller surface,

characterized in that said process further includes the step of determining both whether the receiving sheet is paper based or resin based and, if resin based whether the image to be fixed is composed of black toner or one or more color toners,

if said sheet is resin based and contains one or more color toners, preventing said wick from rotating with said roller surface to force said wick to slide on said roller surface, and

if said sheet is paper based permitting said wick to roll with the roller surface.

**4,942,434**

## FIXED ROLLER FOR AN ELECTROSTATIC IMAGE RECORDER

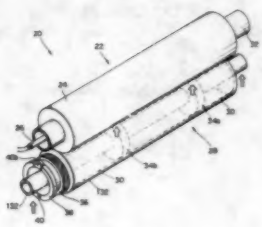
**Junji Nakai, Tokyo, and Sakae Ishikawa, Kawaguchi, both of Japan, assignors to Ricoh Company, Ltd., Tokyo, Japan**

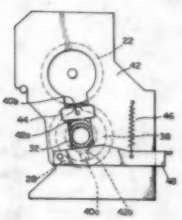
**Filed Dec. 9, 1988, Ser. No. 282,258**

**Claims priority, application Japan, Dec. 11, 1987, 62-311832; Dec. 16, 1987, 62-316097; Dec. 24, 1987, 62-325405; Dec. 28, 1987, 62-330253; Dec. 28, 1987, 62-330254; Aug. 26, 1988, 63-210617**

**Int. Cl.[5] G03G *15/20***

**U.S. Cl. 355—290** **13 Claims**





1. A heat roller type fixing device for an electrostatic image recorder, comprising:

a hollow cylindrical fixing roller accommodating a heat source in said fixing roller;

a hollow cylindrical pressing roller held in pressing contact with said fixing roller;

a shaft disposed in said pressing roller; and

a plurality of pressing members mounted on said shaft within said pressing roller and urging a cylindrical inner periphery of said pressing roller to impact a pressing force to said pressing roller;

said pressing members being each controllably movable to a predetermined position within said pressing roller wherein said pressing members comprise bearings which are mounted on said shaft.

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**4,942,435**

## SHEET FEEDING AND LEVELING APPARATUS

**Charles S. Kneisel, Farmington; Kenneth B. Mahon, Rochester, and Raymond A. Povio, Fairport, all of N.Y., assignors to Xerox Corporation, Stamford, Conn.**

**Filed Sep. 28, 1988, Ser. No. 250,186**

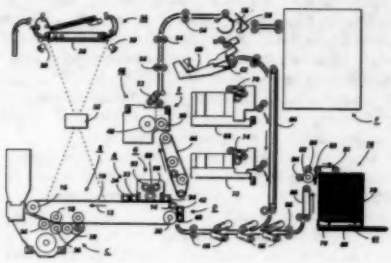
**Int. Cl.[5] G03G *15/00;* B65H *1/12***

**U.S. Cl. 355—311** **24 Claims**

9. An electrophotographic printing machine of the type in which a latent image is developed on a photoconductive member and the developed image transferred to a copy sheet with successive copy sheets being supplied from a supply source thereof, wherein the improvement includes:

a tray arranged to have a stack of copy sheets disposed thereon; and

means, adapted to be interposed between said tray and the stack of copy sheets when one marginal region of the stack of copy sheets has a greater thickness than the other marginal region thereof, for supporting the stack of copy sheets so that at least opposed marginal regions of the



uppermost sheet of the stack of copy sheets are at substantially about the same level, said supporting means comprises means for fixedly supporting the other marginal region of the stack of sheets, and spring means for resiliently supporting at least the one marginal region of the stack of sheets having the greater thickness, said fixed supporting means and said resilient supporting means engaging the lowermost sheet of the stack of copy sheets.

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**4,942,436**

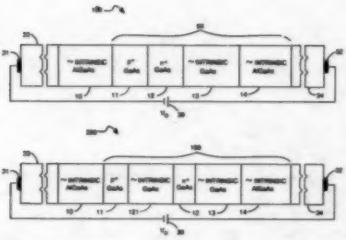
## SUPERLATTICE AVALANCHE PHOTODETECTOR

**William T. Vetterling, Lexington, Mass., assignor to Polaroid Corporation, Cambridge, Mass.**

**Filed Oct. 31, 1988, Ser. No. 265,035**

**Int. Cl.[5] H01L** *29/205, 27/14*

**U.S. Cl. 357—4** **16 Claims**



1. An avalanche photodiode device comprising:

a plurality of superlattice units serially connected with respect to each other each unit of which includes the following contiguous layers in sequence:

a $p^+$ layer of a first material;

an $n^+$ layer of the first material;

a substantially intrinsic layer of the first material; and

a substantially intrinsic layer of a second material having a larger ionization threshold than that of the first material, said substantially intrinsic layer of said second material of each unit, excepting the last of said serially connected units, adjoining the $p^+$ layer of the next succeeding unit to define a heterojunction therebetween.

**4,942,437**

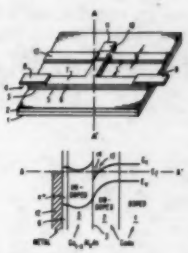
## ELECTRON TUNED QUANTUM WELL DEVICE

**Alan B. Fowler, Yorktown Heights, N.Y., and Gregory L. Timp, Farmingdale, N.J., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Continuation of Ser. No. 110,611, Oct. 20, 1987, abandoned, which is a continuation-in-part of Ser. No. 854,635, Apr. 22, 1986, abandoned. This application Jan. 13, 1989, Ser. No. 298,241**

**Int. Cl.[5] H01L** *29/161*

**U.S. Cl. 357—16** **1 Claim**



1. In a signal translator which includes a single conducting path of given length on the surface of a semiconductor member of layers of $Ga_{1-x}Al_xAs$ on GaAs said member having a heterojunction therein and a potential well containing electrons adjacent said heterojunction, said GaAs being undoped and separated from a substrate by a buffer layer of GaAs doped with Si to $10^{17}$ atom/cm$^3$ and said $Ga_{1-x}Al_xAs$ being undoped adjacent said heterojunction and having a region at the surface of $Ga_{0.35}Al_{0.65}As$ doped with Si to $10^{17}$ atoms/cm$^3$, the improvement comprising a turnable stub having a length dimension (L) of 2000 Å connected to and extending from said path at a location along said given length and gate means having a width dimension (W) of 1000 Å for providing a localized electric field across said heterojunction under a portion of said tunable stub the latter having a length less than the means free path length for the scattering of electrons in said second semiconductor material.

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**4,942,438**

## COMPOUND SEMICONDUCTOR FIELD-EFFECT TRANSISTOR

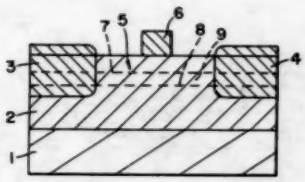
**Hironobu Miyamoto, Tokyo, Japan, assignor to NEC Corporation, Japan**

**Filed Sep. 23, 1988, Ser. No. 248,545**

**Claims priority, application Japan, Sep. 25, 1987, 62-242143**

**Int. Cl.[5] H01L** *29/80*

**U.S. Cl. 357—16** **26 Claims**




1. A field effect transistor comprising:

a source and a drain;

a channel region between said source and said drain;

a gate formed on said channel region; and

two planar-doped layers, each of said planar-doped layers

having two-dimensionally doped impurities, said planar-doped layers being located within said channel region, being in contact with both said source and said drain, and being separated by an interval which is equal to or smaller than about 70 Å.

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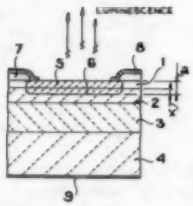
## 4,942,439
## LIGHT-EMITTING DIODE OF GaAsP COMPOUND SEMICONDUCTIVE MATERIAL

**Werner Schairer, Weinsberg, Fed. Rep. of Germany, assignor to Telefunken electronic GmbH, Heilbronn, Fed. Rep. of Germany**

**Filed Jun. 29, 1988, Ser. No. 213,181**
**Claims priority, application Fed. Rep. of Germany, Jul. 1, 1987, 3721761**
**Int. Cl.[5] H01L** *33/00*
**U.S. Cl. 357—17** **15 Claims**




1. A light emitting diode, comprising:
a semiconductor substrate;
a GaAsP compound crystal system on said substrate, including:
a first n-doped GaAsP surface layer having a first energy bandgap, on said substrate, and
a second n-doped GaAsP surface layer having a second energy bandgap, directly on said first surface layer; and
a p-type region extending through said second surface layer into said first surface layer, said second energy bandgap being greater than said first energy bandgap.

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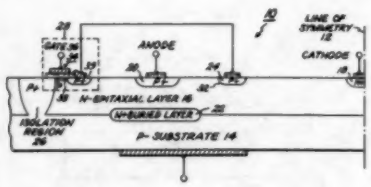
## 4,942,440
## HIGH VOLTAGE SEMICONDUCTOR DEVICES WITH REDUCED ON-RESISTANCE

**Bantval J. Baliga, and Eric J. Wildi, both of Clifton Park, N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Continuation of Ser. No. 47,524, May 4, 1987, abandoned, which is a continuation of Ser. No. 774,195, Sep. 9, 1985, abandoned, which is a continuation of Ser. No. 436,244, Oct. 25, 1982, abandoned. This application Sep. 9, 1988, Ser. No. 243,210**
**Int. Cl.[5] H01L** *29/78*
**U.S. Cl. 357—23.1** **36 Claims**




1. In combination:
a semiconductor device comprising a body of semiconductor material including:
a substrate of one conductivity type with a layer of opposite conductivity type thereon, and including first and second regions disposed within said layer; said first region being of said opposite conductivity type and more heavily doped than said layer and extending to an upper surface of said body and said second region being of said one conductivity type, extending to said upper surface, being spaced from and surrounding said first region,
a third region of said opposite conductivity type buried between said layer and said substrate beneath said second region and spaced from said second region by a portion of said layer,
a fourth region of said one conductivity type disposed within said layer, forming a P-N junction therewith, extending to said surface, being spaced from and surrounding said first region and, in turn, being surrounded by and spaced from said second region, and
a controllable bias means integrated therein for controllably connecting said fourth region to said substrate and disconnecting said fourth region from said substrate;
a first electrode in ohmic contract with said first region;
a second electrode in ohmic contact with said second region;
a third electrode connected as an output electrode of said controllable bias means;
a fourth electrode in ohmic contact with said fourth region;
a fifth electrode connected as a control electrode for said controllable bias means;
a sixth electrode in ohmic contact with said substrate;
said third electrode being ohmically connected to said fourth electrode to enable said controllable bias means to control the potential of said fourth region to establish different degrees of conductivity in said layer between said first region and said second region in response to control signals applied to said fifth electrode.

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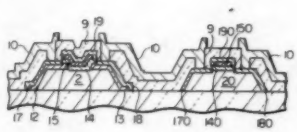
## 4,942,441
## THIN FILM SEMICONDUCTOR DEVICE AND METHOD OF MANUFACTURING THE SAME

**Nobutake Konishi; Yoshikazu Hosokawa, both of Hitachiota; Akio Mimura; Takaya Suzuki, both of Katsuta; Jun-ichi Ohwada, Hitachi; Hideaki Kawakami, Mito, and Kenji Miyata, Katsuta, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Mar. 27, 1987, Ser. No. 30,623**
**Claims priority, application Japan, Mar. 29, 1986, 61-69818**
**Int. Cl.[5] H01L** *29/78*
**U.S. Cl. 357—23.7** **13 Claims**




1. A complementary thin film semiconductor device comprising:
an insulating underlie for supporting the semiconductor device to be formed thereon;
a pair of thin film semiconductor island regions supported on said insulating underlie, spaced from each other and having a high resistivity and a conductivity type of i- or n-type;
a pair of heavily doped n-type regions formed on one of said island regions and spaced from each other by a predetermined distance, the heavily doped regions constituting a source and a drain region of an n-channel thin film transistor (n-TFT) and the predetermined distance defining a channel length of the n-TFT;
a first pair of metal contacts formed on a surface of the other of said island regions and spaced from each other by another predetermined distance, the metal contact forming a high potential barrier when the underlying semiconductor region is of n-type and a reduced potential barrier

when the underlying region is of p-type, the pair of metal contacts constituting a source and a drain region of a p-channel thin film transistor (p-TFT) and said another predetermined distance defining a channel length of the p-TFT;

a pair of insulated gate structures formed on said pair of island regions, each at a position between the source and the drain of the associated TFT; and

a second pair of metal contacts formed on said pair of heavily doped n-type regions not to contact directly with said island region, wherein the insulated gate structure of the n-channel thin film transistor is formed to overlap predetermined portions of said source region and said drain region of the n-channel thin film transistor.

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**4,942,442**

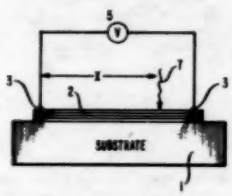
**DEVICE INCLUDING A RADIATION SENSOR**

**Clyde G. Bethea, Plainfield; Daniel Brasen, Lake Hiawatha; Barry F. Levine, Livingston, and Ronald H. Willens, Warren, all of N.J., assignors to American Telephone and Telegraph Company AT&T Bell Laboratories, Murray Hill, N.J.**

**Continuation of Ser. No. 850,977, Apr. 11, 1986, abandoned. This application Apr. 27, 1989, Ser. No. 346,384**

**Int. Cl.[5] H01L *49/02***

**U.S. Cl. 357—29** **13 Claims**




1. Device comprising a radiation-sensitive element which comprises a substrate-supported layered structure consisting of interleaved at least one first and at least one second layers, and first and second electrical contacts to said element,

CHARACTERIZED IN THAT said at least one first layer consists of semiconductor material, said at least one second layer consists of conductor material, and said contacts are to the same face of said layered structure.

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**4,942,443**

**THYRISTOR WITH AUXILIARY EMITTER ELECTRODE AND SHORT-CIRCUIT REGIONS AND METHOD**

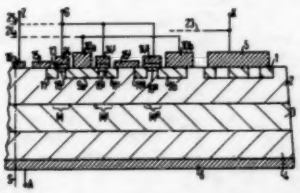
**Michael Stoisiek, Ottobrunn, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Apr. 21, 1982, Ser. No. 370,495**

**Claims priority, application Fed. Rep. of Germany, May 8, 1981, 3118317**

**Int. Cl.[5] H01L *29/74***

**U.S. Cl. 357—38** **6 Claims**



1. A thyristor with a semiconductor body having an n-emitter contacted by a cathode with an adjacent p-base layer, a p-emitter contacted by the anode with an adjacent n-base layer, and an auxiliary emitter region with an auxiliary emitter electrode, at least one disconnectible current path designed as a MIS structure provided at the boundary surface of the semiconductor body carrying the auxiliary emitter electrode, said disconnectible current path comprising a semiconductor region of a first conductivity type connected to the adjacent base layer, a second semiconductor region of the first conductivity type connected to the auxiliary emitter electrode, and a semiconductor region of a second conductivity type lying between said semiconductor regions, said semiconductor region of said second conductivity type being covered by a gate having a control terminal and electrically insulated from the semiconductor body, one of said emitters having a plurality of fixed emitter short-circuits, the first semiconductor region of said disconnectible current path including an edge area of the auxiliary emitter region, the said second semiconductor region including a short-circuit region which is inserted into the base layer adjacent to the auxiliary emitter region and connected to said base layer over a conductive coating, and said semiconductor region covered by a gate including a sub-region of said base layer.

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**4,942,444**

**THYRISTOR**

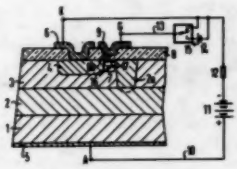
**Ulrich Ablassmeier, Waltenhofen, Fed. Rep. of Germany, assignor to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Jun. 14, 1979, Ser. No. 48,603**

**Claims priority, application Fed. Rep. of Germany, Aug. 10, 1978, 2835089**

**Int. Cl.[5] H01L *29/74***

**U.S. Cl. 357—38** **2 Claims**



1. A plurality of integrated thyristors, comprising:

common body section formed from a series of first, second, and third stacked semiconductor layers of alternate conductivity types with an anode electrode affixed to the first layer at a first end thereof;

a plurality of spaced apart cathode regions formed in the third semiconductor layer at the opposite end of the body adjacent the exterior surface thereof;

each said cathode region has a cathode electrode affixed thereto and has a conductivity type opposite that of said third semiconductor layer;

an insulating layer covering the remaining exterior surface of said third semiconductor layer;

a plurality of spaced apart additional regions, each said additional region being formed in said third semiconductor layer adjacent a corresponding cathode region and at a distance therefrom corresponding to a channel length of a field effect transistor, each said additional region extending through said third semiconductor layer to the next layer and each said additional region having the same conductivity type as does each said cathode region;

each said gate region having a gate electrode on said insulating layer positioned adjacent a corresponding cathode electrode and substantially between said gate region and said associated cathode region; and

adjacent gate regions having their respective gate electrodes

as a common gate electrode comprising a continuous metal layer running above and over the additional region between the adjacent gate regions.

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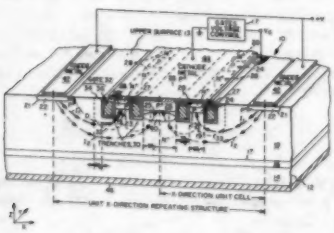
4,942,445

## LATERAL DEPLETION MODE TYRISTOR

Bantval J. Baliga, Schenectady, and Hsueh-Rong Chang, Scotia, both of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Jul. 5, 1988, Ser. No. 217,449
Int. Cl.[5] H01L 29/74, 27/02, 29/78
U.S. Cl. 357—38 23 Claims



1. A lateral semiconductor device comprising:

a body of semiconductor material having first and second opposed major surfaces, said body including:

a first emitter region of one type conductivity extending to said first surface,

a first base region of opposite type conductivity, disposed adjacent to and forming a first PN junction with said first emitter region and extending to said first surface,

a second base region of said one type conductivity disposed adjacent to said first base region, forming a second PN junction with said first base region and spaced from said first emitter region,

a second emitter region of said opposite type conductivity disposed adjacent to said second base region, forming a third PN junction with said second base region, spaced from said first base region and extending to said first surface;

a first power electrode disposed on said first surface and ohmically contacting said first emitter region;

a second power electrode disposed on said first surface and ohmically contacting said second emitter region;

said device including a regenerative four-layer current path extending between said first and second power electrodes through said first emitter region, first and second base regions and said second emitter region and a non-regenerative three-layer current path extending between said first and second power electrodes through three of said four regions; and

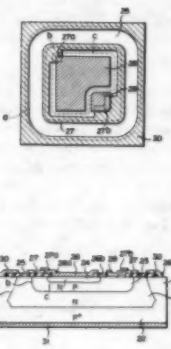
an insulated gate electrode disposed adjacent to a channel portion of one of said base regions, said channel portion being narrow enough that when current is flowing between said first and second power electrodes through said regenerative current path in a regenerative thyristor mode, application of an appropriate turn-off bias voltage to said gate electrode causes said channel portion of said one of said base regions to become sufficiently depleted of carriers to divert enough of said current from said regenerative current path into said non-regenerative current path to interrupt regenerative thyristor action in said regenerative current path to thereby turn said device off.

4,942,446

## SEMICONDUCTOR DEVICE FOR SWITCHING, AND THE MANUFACTURING METHOD THEREFOR

Shigenori Yakushiji, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 10,734, Feb. 4, 1987, abandoned. This application Dec. 15, 1988, Ser. No. 285,304
Claims priority, application Japan, Feb. 27, 1986, 61-42257
Int. Cl.[5] H01L 29/74
U.S. Cl. 357—38 4 Claims



1. A semiconductor device comprising:

a semiconductor substrate region of a first conductivity type surrounded by an element-isolation region;

a first semiconductor diffused base region of a second conductivity type formed in said semiconductor substrate region and forming a first p-n junction exposed at one surface of said semiconductor substrate region;

an anode region of a second conductivity type formed integrally with said element-isolation region and forming a second p-n junction exposed at said one surface of said semiconductor substrate region at a location different from that of said first p-n junction;

an anode electrode connected to said anode region;

a second semiconductor diffused cathode region of the first conductivity type formed in said first semiconductor region, said second semiconductor region being separated by said first semiconductor region from said semiconductor substrate region;

an insulating film formed on said one surface of said semiconductor substrate region; and

a first conductivity layer covering said exposed first p-n junction via said insulating film, said first conductive layer having a first portion and a second portion, with a predetermined electric resistance between said first and second portions, said first portion being electrically connected to said first semiconductor region via a gate electrode, and said second portion being electrically connected to said second semiconductor region via a cathode electrode, wherein said first portion and said second portion are positioned on said first conductive layer in relative spaced-apart relation with a portion of said first p-n junction being covered by said first conductive layer and a remaining portion thereof being covered with an electrode connected to one of said first and second portions; and

a second conductive layer covering said exposed second p-n junction via said insulating film and electrically connected to said element isolation region.

4,942,447

## BORDERLESS MASTER SLICE CMOS DEVICE

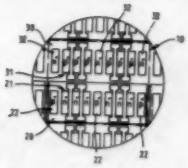
Hak-song Park; Byoung-jin Choi, both of Seoul, and Heung-chul Oh, Kyounggi-do, all of Rep. of Korea, assignors to Samsung Electronics Co., Ltd., Suwon Kyounggi-do, Rep. of Korea

Filed May 25, 1989, Ser. No. 357,038

Claims priority, application Rep. of Korea, Jul. 23, 1988, 88-9291

Int. Cl.[5] H01L *27/02*

U.S. Cl. 357—42 7 Claims



1. A borderless master slice semiconductor device, comprising:

a plurality of first conduction type independent well regions arranged on the whole area of a second conduction type semiconductor wafer in a row direction;

a plurality of second conduction type MOS transistor groups arranged in a row direction within said first conduction type independent well regions, each of said second conduction type MOS transistor groups having respectively current paths connected in series and gate terminals arranged in parallel in a row direction;

a plurality of first conduction type diffusion regions arranged at the opposite sides of said second conduction type MOS transistor groups in a line;

a plurality of second conduction type intermediate regions disposed between said adjacent first conduction type independent well regions arranged in a column direction;

a plurality of first conduction type MOS transistor groups arranged in a row direction within said second conduction type intermediate regions in correspondence to said second conduction type MOS transistor groups within said first conduction type independent well regions, each of said first conduction type MOS transistor groups having current paths connected in a series and gate terminals arranged in parallel in a row direction; and

a plurality of second conduction type diffusion regions arranged at the opposite sides of said first conduction type MOS transistor groups in a line.

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4,942,448

## STRUCTURE FOR ISOLATING SEMICONDUCTOR COMPONENTS ON AN INTEGRATED CIRCUIT AND A METHOD OF MANUFACTURING THEREFOR

Katsuhiro Tsukamoto; Masahide Inuishi, and Masahiro Shimizu, all of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan

Filed Oct. 25, 1988, Ser. No. 262,303

Claims priority, application Japan, Nov. 17, 1987, 62-291340

Int. Cl.[5] H01L *29/78*

U.S. Cl. 357—49 33 Claims

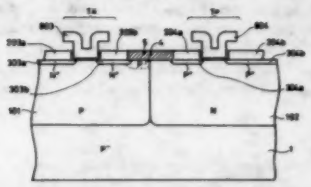
1. A semiconductor apparatus having a region for isolation between devices comprising:

a semiconductor substrate having a main surface and having a predetermined impurity concentration of a certain conductivity type;

portions of a polycrystalline silicon layer selectively formed spaced apart rom each other on the main surface of said semiconductor substrate;

a semiconductor region of the inverse conductivity type from that of said semiconductor substrate, formed in said semiconductor substrate under said polycrystalline silicon layer; and

an insulating layer including an oxide film formed on said main surface of said semiconductor substrate to fill in a



portion in which the main surface of said semiconductor substrate is exposed between adjacent portions of said polycrystalline silicon layer spaced from each other, whereby said semiconductor region is isolated by said insulating layer oxide film.

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4,942,449

## FABRICATION METHOD AND STRUCTURE FOR FIELD ISOLATION IN FIELD EFFECT TRANSISTORS ON INTEGRATED CIRCUIT CHIPS

Ching-Yeu Wei; Patricia A. Piacente, both of Schenectady, and Henry H. Woodbury, Scotia, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.

Filed Mar. 28, 1988, Ser. No. 173,918

Int. Cl.[5] H01L *29/34*

U.S. Cl. 357—54 5 Claims

1. A field isolation structure for field effect transistors, said structure comprising:

a doped silicon plateau region exhibiting a raised, substantially planar central region having a sidewall sloping downwardly away from said central region;

a layer of thermally grown silicon oxide surrounding said central region and including at least a portion extending onto said central region, said oxide layer being tapered in the direction of said sloping sidewall; and

a layer of deposited silicon oxide disposed over and in contact with said thermally grown silicon oxide at least along substantially most of said sidewall and extending, along said portion of said thermally grown silicon oxide, to said central region.

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4,942,450

## SEMICONDUCTOR MEMORY DEVICE HAVING NON-VOLATILE MEMORY TRANSISTORS

Shinichi Iwashita, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan

Filed Jul. 8, 1988, Ser. No. 216,588

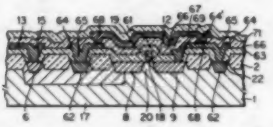
Claims priority, application Japan, Jul. 8, 1987, 62-171511

Int. Cl.[5] H01L *29/78, 29/34, 23/48, 25/04*

U.S. Cl. 357—54 4 Claims

1. A semiconductor memory device comprising a semiconductor substrate of a first conductivity type, a non-volatile memory transistor formed on said substrate having a floating gate electrode and a control gate electrode, a first means for leading out said control gate electrode of said transistor, and a second means for shielding said floating gate electrode of said transistor, said first means including a first impurity region of a

second conductivity type opposite to said first conductivity type formed in said substrate and connected electrically at a first section of said first impurity region to said control gate electrode through a first wiring layer made of a first level metal layer, and a second wiring layer made of said first level metal layer and connected to a second section of said first impurity region, said second means including a second impurity region of said first conductivity type having an impurity concentration higher than said substrate and than said first impurity region, formed in said substrate and crossing said first



impurity region between said first and second sections of said first impurity region, and an metallic film covering said floating gate electrode and said control gate electrode and contacted to said second impurity region, said metallic film being composed of a lower metal layer made of said first level metal layer, connected to said second impurity region, crossing over said first impurity region and having a ring-like plan shape so as to surround said floating and control gate electrodes, and an upper metal layer made of a second level metal layer covering said floating and control gate electrodes and formed on and in contact with said lower metal layer.

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**4,942,451**

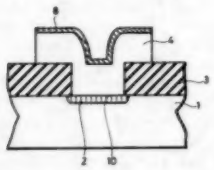
**SEMICONDUCTOR DEVICE HAVING IMPROVED ANTIREFLECTION COATING**

**Reiji Tamaki, and Shigeru Harada, both of Hyogo, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Sep. 27, 1988, Ser. No. 249,907**

**Int. Cl.[5] H01L *23/48***

**U.S. Cl. 357—67** **5 Claims**



1. A semiconductor device formed in a predetermined region of a semiconductor substrate and including an impurity diffused layer to serve as an active region, comprising:

an interconnection layer formed on said semiconductor substrate so as to receive and send electrical signals from and to said impurity diffused layer, and

an antireflection coating containing aluminum as a major constituent and formed on said interconnection layer so as to prevent reflection of exposure light irradiated for patterning a resist film utilized as a mask when said interconnection layer is patterned in a predetermined shape,

said antireflection coating additionally comprising a second element which is the same as an element contained in the substrate and at least a third element in a group adjacent, in the periodic table, to a group to which said second element belongs.

**4,942,452**

**LEAD FRAME AND SEMICONDUCTOR DEVICE**

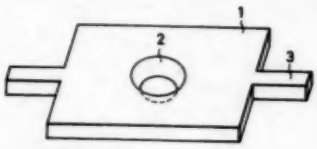
**Makoto Kitano; Suco Kawai, both of Ibaraki; Asao Nishimura, Ushiku; Hideo Miura; Akihiro Yaguchi; Chikako Kitabayashi, both of Ibaraki; Ichio Shimizu, Gunma; Toshio Hatsuda; Toshinori Ozaki, both of Ibaraki; Toshio Hattori, Ushiku, and Souji Sakata, Ibaraki, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Feb. 22, 1988, Ser. No. 158,673**

**Claims priority, application Japan, Feb. 25, 1987, 62-40287; Mar. 13, 1987, 62-56590**

**Int. Cl.[5] H01L *23/48, 23/12***

**U.S. Cl. 357—68** **23 Claims**



1. In a lead frame comprising a unitary structure of a chip pad for mounting a semiconductor chip on a chip-mounting surface thereof and a group of leads connected to said chip pad along said chip pad, the improvement wherein a through hole is formed in at least a portion of said chip pad, said through hole being projected in a direction which is tilted relative to a direction from the plane of the chip-mounting surface of said chip pad.

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**4,942,453**

**IC PACKAGE**

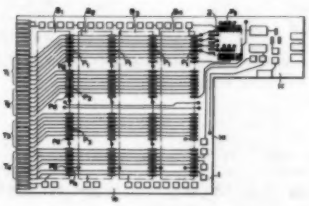
**Yoshihiro Ishida; Yoshio Iinuma, and Shingo Ichikawa, all of Saitama, Japan, assignors to Citizen Watch Co., Ltd., Tokyo, Japan**

**Filed Sep. 15, 1988, Ser. No. 244,794**

**Claims priority, application Japan, Apr. 26, 1988, 63-102998; May 17, 1988, 63-118169; Jun. 3, 1988, 63-136856**

**Int. Cl.[5] H01L *23/48, 29/44, 29/52, 29/60***

**U.S. Cl. 357—68** **13 Claims**



1. An IC package comprising:

(a) a main board including;

a plurality of row-direction common printed wiring patterns running in a row direction on at least a front side of said main board, said row-direction common printed wiring patterns being provided in groups,

chip selecting printed terminal patterns each belonging to and provided near said respective groups of said printed wiring patterns, and

a plurality of external connecting printed terminal patterns aligned along one of the edges of said main board, said plurality of external connecting printed terminal patterns having a plural number of external common printed connecting terminal patterns and a smaller number of external chip selecting control printed terminal

patterns corresponding to said respective groups of rowdirection printed wiring patterns,

said respective groups of row-direction common printed wiring patterns being connected to the corresponding external common connecting printed terminal patterns by means of printed wiring patterns without crossing each other on the front side of said main board,

(b) a plurality of IC chip units each including;

a single auxiliary board and a plurality of IC chips mounted in a column on said auxiliary board, said single auxiliary board extending in a column direction and being rectangular;

said IC chips each having a plural number of common connecting terminals and a smaller number of chip selecting terminals and being of the substantially same type;

said auxiliary board including;

a plurality of column-direction common printed wiring patterns running in a column direction corresponding to said common connecting printed terminals of said IC chips on a front side of said auxiliary board;

chip selecting printed terminal patterns corresponding to said respective IC chips; and

unit connecting printed terminal patterns provided in a column along one of the edges in parallel with said column-direction common printed wiring patterns of said auxiliary board,

said unit connecting printed terminal patterns including;

unit common connecting printed terminal patterns provided corresponding to said row-direction common printed wiring patterns provided in groups on said main board; and

unit chip selecting printed terminal patterns provided corresponding to the chip selecting printed terminal patterns on said main board;

said common connecting terminals of said respective IC chips being connected to said respective column-direction common printed wiring patterns on the corresponding auxiliary board, and said chip selecting terminals of said respective IC chips being connected to the corresponding chip selecting printed terminal patterns on said auxiliary board,

said column-direction common printed wiring patterns on said auxiliary board being connected to said unit common connecting printed terminal patterns, and said respective chip selecting printed terminal patterns on said auxiliary board being connected to said unit chip selecting printed terminal patterns,

(c) said plurality of IC chip units being superimposed on each other on said main board so that said plurality of IC chip units are arranged in parallel with each other and that the column-direction printed wiring patterns of the respective IC chip unit are perpendicular to the row-direction printed wiring patterns on the main board;

said respective unit common connecting printed terminal patterns being electrically connected to said corresponding row-direction common printed wiring patterns on the main board; and the respective unit chip selecting printed terminal patterns being electrically connected to the corresponding chip selecting printed terminal patterns on the main board; and

(d) at least one chip selecting circuit provided on said main board, input terminals of said chip selecting circuit being connected to said external chip selecting control printed terminal patterns, and output terminals of said chip selecting circuit being connected to said chip selected printed terminal patterns on the main board.

**4,942,454**

## RESIN SEALED SEMICONDUCTOR DEVICE

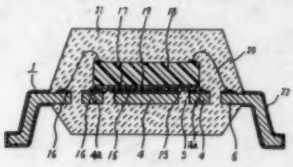
**Ryuichiro Mori; Katsuyuki Fukudome; Tatsuhiko Akiyama, and Yoshitaka Takemoto, all of Itami, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan**

**Filed Aug. 2, 1988, Ser. No. 227,332**

**Claims priority, application Japan, Aug. 5, 1987, 62-196853; Jan. 12, 1988, 63-2975**

**Int. Cl.[5] H01L *23/48***

**U.S. Cl. 357—70** **3 Claims**



1. A packaged semiconductor device comprising:

a die pad having a main surface and through holes having walls that extend to said main surface;

a metal film having a composition different from that of said die pad disposed on said main surface but not on said walls;

a semiconductor element mounted on said metal film with a fixing material that wets said die pad relatively poorly and that wets said metal film relatively well; and

a resin encapsulating said die pad and semiconductor element and disposed in said holes.

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**4,942,455**

## LEAD FRAME FOR A SEMICONDUCTOR DEVICE AND A METHOD FOR MANUFACTURING A SEMICONDUCTOR DEVICE USING THE LEAD FRAME

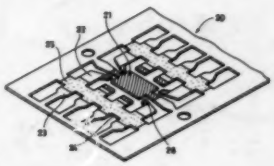
**Toshiaki Shinohara, Hyogo, Japan, assignor to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Oct. 13, 1987, Ser. No. 108,907**

**Claims priority, application Japan, Oct. 13, 1986, 61-243612**

**Int. Cl.[5] H01L *29/60***

**U.S. Cl. 357—70** **3 Claims**



1. In a lead frame of a resin sealed type semiconductor device package wherein the lead frame includes a die pad disposed in a central portion thereof with an inner lead, a tie bar and an outer lead formed around the die pad with the tie bar disposed between the inner and outer lead, a chip mounted to the pad and wires connecting the chip to a metal plated surface of the inner lead, and molded resin material covering the chip and at least portions of said metal plated surface of the inner lead and the wires, the improvement comprising said molded resin material having at least a pair of border edges free of burs or bur residues and overlying a surface of the inner lead, said border edges free of burs or bur residues being formed by disposing a thin metal layer on predetermined surfaces of at least the inner lead with edges of said thin metal layer defining said border edges of resin material disposed to cover said chip and metal plated surface portions of the inner lead, with said thin metal layer having a melting temperature greater than the

temperature of liquid resin material with said thin metal layer removed from the lead frame subsequent to solidification of the resin material.

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**4,942,456**

**PLASTIC PACKAGED DEVICE HAVING A HOLLOW PORTION ENCLOSING A CHIP ELEMENT**

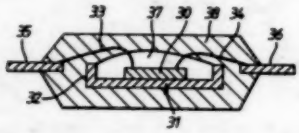
**Shigeki Sako, Kawagawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Aug. 22, 1988, Ser. No. 235,455**

**Claims priority, application Japan, Aug. 28, 1987, 62-214319**

**Int. Cl.[5] H01L *23/02***

**U.S. Cl. 357—72** **10 Claims**




1. A packaged electronic device, comprising:
an electronic chip element;
means for supporting the chip element;
packaging means for enclosed said chip element;
wall means disposed on said supporting means for defining an area surrounding the electronic chip element; and
said packaging means and said wall means defining a hollow space extending from said area and separating the chip element from contact with said packaging means.

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**4,942,457**

**CIRCUIT ARRANGEMENT FOR PROCESSING VIDEO COMPONENTS**

**Heinz-Werner Keesen, Hanover, Fed. Rep. of Germany, and Laurent Perdrieau, Illkirch, France, assignors to Deutsche Thomson-Brandt GmbH, Fed. Rep. of Germany**

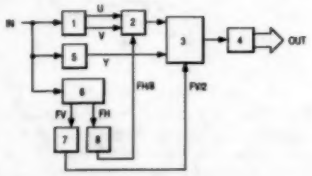
**PCT No. PCT/EP88/00865, § 371 Date May 25, 1989, § 102(e) Date May 25, 1989, PCT Pub. No. WO89/03155, PCT Pub. Date Apr. 6, 1989**

**PCT Filed Sep. 27, 1988, Ser. No. 360,918**

**Claims priority, application Fed. Rep. of Germany, Sep. 30, 1987, 3733004**

**Int. Cl.[5] H04N *11/06***

**U.S. Cl. 358—12** **5 Claims**




1. A circuit arrangement for processing video signal components including an analog luminance component and first and second analog chrominance components, said circuit arrangement comprising:
respective input terminals for receiving said analog luminance component and said first and second analog chrominance components;
multiplexing means having first, second and third input terminals for respectively receiving said first and second analog chrominance components and said luminance component, and having an output terminal; and
means coupled to said multiplexing means for conditioning said multiplexing means to provide at its output terminal, fields of video signal alternating between a field of said first and second analog chrominance components and a field of said analog luminance components and for conditioning said multiplexing means to provide said field of first and second analog chrominance components as successive groups of N horizontal lines of said first analog chrominance component alternating with groups of M horizontal lines of said second analog chrominance component where M and N are integers greater than one.

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**4,942,458**

**COLOR LIQUID CRYSTAL DISPLAY APPARATUS**

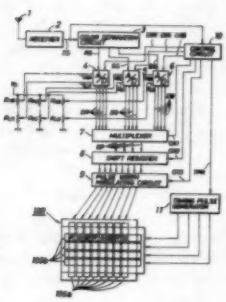
**Akira Miyajima, Tokyo; Atushi Shiraishi, and Yasuyuki Yoshida, both of Saitama, all of Japan, assignors to Citizen Watch Co., Ltd., Japan**

**Continuation of Ser. No. 268,910, Nov. 8, 1988, abandoned. This application Feb. 20, 1990, Ser. No. 481,801**

**Claims priority, application Japan, Nov. 10, 1987, 62-282229**

**Int. Cl.[5] H04N *9/30, 9/73***

**U.S. Cl. 358—29** **5 Claims**



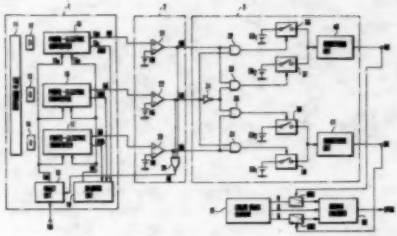
1. An apparatus for adjusting color balance to match the characteristics of a color liquid crystal display comprising:
a receiver for receiving an external radio wave and outputting a video signal;
a color separation circuit for color-separating the video signal and outputting red, green, and blue video output signals;
a separate A/D converter for A/D-converting each of the separate red, green, and blue video output signals and outputting separate red, green, and blue digital output signal;
a liquid crystal panel, having a plurality of pixels formed therein, for displaying an image on the basis of the red, green, and blue digital output signals generated by each said A/D converter; and
adjusting means which can independently adjust both the low and high reference potentials used as references for A/D conversion of each of the red, green, and blue video output signals by each said A/D converter.

4,942,459

## COLOR TEMPERATURE DETECTING DEVICE FOR PRODUCING A COLOR TEMPERATURE SIGNAL DEVELOPED USING THE RATIO BETWEEN COLOR COMPONENT SIGNALS

**Teruo Hieda; Hiroyuki Shimizu, and Kazunori Masuda, all of Kanagawa, Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed May 12, 1988, Ser. No. 192,958**
**Int. Cl.[5] H04N *9/097, 9/73***
**U.S. Cl. 358—41** **7 Claims**



1. A color temperature detecting device comprising:

(a) color component detecting means for detecting electric charges for color components excited by incident light and accumulated with the lapse of time to produce color component signals;

(b) comparison means for comparing the color component signals with respective given reference signals to produce discharge time length signals which correspond to the respective accumulated amounts of the electrical charges, said comparison means including: hold means for holding each of said color component signals; discharge means for discharging each of said color component signals held by said hold means; and a comparator for comparing outputs of said hold means with respective predetermined reference levels; and

(c) an output part for obtaining a ratio between the color components on the basis of the discharge time length signals produced from said comparison means to produce as color temperature information a signal according to said ratio.

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4,942,460

## METHOD OF AND APPARATUS FOR RECORDING A HALFTONE DOT COLOR IMAGE ON A COLOR PHOTOSENSITIVE MATERIAL

**Yukihiko Inagaki; Yoshikazu Masuda; Shigeru Sasada; Mikizo Katsuyama, and Hirohisa Tanaka, all of Kyoto, Japan, assignors to Dainippon Screen Mfg. Co., Ltd., Japan**

**Filed Dec. 8, 1988, Ser. No. 281,541**
**Claims priority, application Japan, Dec. 11, 1987, 62-312279**
**Int. Cl.[5] H04N *1/46***
**U.S. Cl. 358—75** **16 Claims**

10. An apparatus for recording a halftone dot color image on a color photosensitive material, comprising:

means for providing a white beam;

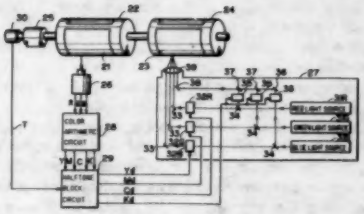
beam extracting means for extracting red, green and blue beams from said white beam;

means for providing yellow, magenta, cyan and black color separation image signals of a desired color image;

means for converting said yellow, magenta, cyan and black color separation image signals respectively into yellow, magenta, cyan and black halftone dot image signals having particular screen angles;

beam modulating means for modulating said red, green, blue and white beams with said halftone dot image signals of cyan, magenta, yellow and black, respectively, to form modulated red, green, blue and white beams;

beam converging means for converging said modulated red, green, blue and white beams onto said color photosensitive material to form an exposure beam spot; and



means for exposing said color photosensitive material to said exposure beam spot by moving said color photosensitive material and said exposure beam spot relative to one another, to record said desired color image in a halftone dot manner on said color photosensitive material.

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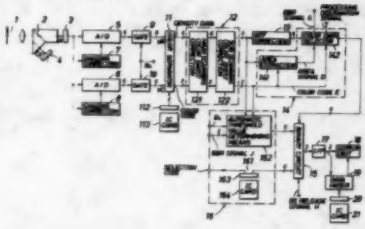
4,942,461

## DIGITAL MULTIPLE-COLOR IMAGE PROCESSING APPARATUS

**Yoshinori Abe; Kazuo Watanabe; Tetsuo Kimoto; Tetsuo Hirata; Chiharu Kobayashi, and Hideki Endo, all of Hachioji, Japan, assignors to Konica Corporation, Tokyo, Japan**

**Filed Aug. 23, 1988, Ser. No. 235,126**
**Claims priority, application Japan, Aug. 24, 1987, 62-208174; Sep. 30, 1987, 62-243655; Sep. 30, 1987, 62-243656; Sep. 30, 1987, 62-243657**
**Int. Cl.[5] H04N *1/46, 1/40;* G03F *3/08***
**U.S. Cl. 358—75** **11 Claims**



1. An image processing apparatus comprising:

photoelectric converting means for photoelectrically converting data of an original into an image signal;

multiple-value means for converting the image signal into multiple-valued data by comparing the image signal with predetermined threshold value data; and

detachable external storage means for storing the threshold value data.

4. An image processing apparatus comprising:

converting means for separating a color image data into plurality of color-separated images and converting the color-separated images into a plurality of color signals;

correcting means for obtaining distortion-corrected digital color signals from the plurality of color signals;

color-separating means for separating the digital color signals into color signals each having a plurality of bits by using color separation data; and

detachable external storage means for storing a color separation table containing the color separation data.

6. An image processing apparatus comprising:

converting means for separating a color image into a plurality of color-separated images and converting the color-separated images into a plurality of color signals;

correcting means for obtaining distortion-corrected digital color signals from the plurality of color signals;

color-separating means for separating the digital color signals into color signals each having a plurality of bits using color separation data; and

multiple-value means for converting the color-separating color signals into multiple-valued data by comparing the color-separated color signal with threshold value data including predetermined threshold value data,

wherein said color-separating means and said multiple-value means include RAMs, and said multiple-value means further includes means for determining said threshold value data in response to gray scale data of at least one of said images, or in response to a manual selection signal.

10. An image processing apparatus comprising:

photoelectric converting means for photoelectrically converting data of an original into an image signal and outputting the image signal;

multiple-value means for converting the image signal into multiple-valued data by comparing the image signal with predetermined threshold value data;

data mixing means for mixing predetermined format data with the multiple-valued data converted by said multiple-value means; and

detachable external storage means for storing the format data.

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**4,942,462**

## PHOTOGRAPHIC PRINTER HAVING A CRT FOR ILLUMINATING AN ORIGINAL WITH A FLYING SPOT TO PRINT AN IMAGE OF THE ORIGINAL

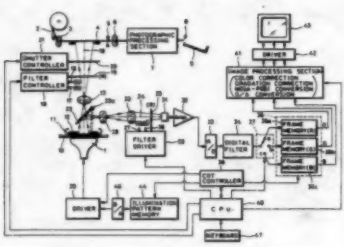
**Kazuo Shiota, Kanagawa, Japan, assignor to Fuji Photo Film Co., Ltd., Kanagawa, Japan**

**Filed Jul. 14, 1988, Ser. No. 218,793**

**Claims priority, application Japan, Jul. 15, 1987, 62-176470; Jul. 31, 1987, 62-191684; Sep. 18, 1987, 62-233799**

**Int. Cl.[5] G03F 3/10**

**U.S. Cl. 358—76** **15 Claims**



1. A photographic printer having a CRT for illuminating an original to print an image of said original on a photographic material, said printer comprising,

a mirror disposed in a printing path between said CRT and said photographic material for reflecting light passed through said original;

light measuring means for measuring said reflected light to provide a plurality of video signals;

means for converting said video signals into digital form;

a digital filter for filtering said digital video signals to cancel a persistency effect of said CRT; and

a frame memory for memorizing the filtered digital video signals.

**4,942,463**

## IMAGE PROCESSING SYSTEM FOR DETECTING EDGES IN AN IMAGE OF AN ARTICLE

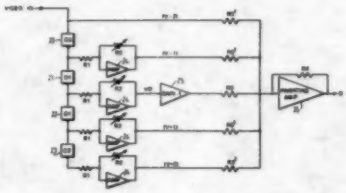
**Brian M. Hopkins, Ennis, Ireland, assignor to Westinghouse Electric Corp., Pittsburgh, Pa.**

**Filed Apr. 20, 1989, Ser. No. 340,989**

**Claims priority, application Ireland, Apr. 22, 1988, 1234/88**

**Int. Cl.[5] H04N 7/00, 7/18**

**U.S. Cl. 358—96** **10 Claims**



1. An image processing system comprising means for line-by-line scanning an article to generate a video signal representing an image of the article, a plurality 2n of series-connected delay means where n is greater than or equal to one and the time delays of the delay means are substantially symmetrical relative to the mid-point of the series, an input for the video signal at one end of the series of delay means, means for normalizing the amplitudes of the underlayed and successively delayed video signal whereby all such amplitudes are equal when the video signal over the total delay period represents a constant intensity portion of the image, and means for forming a signal D representing the difference between n times the amplitude of the video signal at the mid-point of the series of delay means and the sum of the amplitudes of the video signal at the input of the series of delay means and at the output of each delay means except the delay means whose output is at the mid-point of the series, such signal D defining the positions, in the direction of line scanning, of edges between contrasting region of the image.

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**4,942,464**

## SURVEILLANCE DEVICE FOR THE PROTECTION OF AN AUTOMATIC DELIVERY APPARATUS

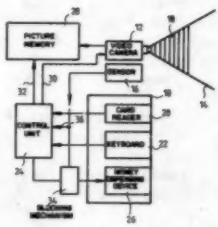
**Erhard Milatz, Johann-Sebastian-Bachstrasse 74, 4019 Monheim, Fed. Rep. of Germany**

**Filed Mar. 9, 1989, Ser. No. 321,564**

**Claims priority, application Fed. Rep. of Germany, Mar. 9, 1988, 3807727**

**Int. Cl.[5] H04N 7/18**

**U.S. Cl. 358—108** **4 Claims**



1. A surveillance device for the protection of an automatic delivery apparatus operable by code carriers, characterized by

(a) a picture recording device (12), which is arranged to be triggered responsive to actuation of said automatic delivery apparatus (10), and which takes and stores a picture of

a field of view (14) within which a user has to be, when actuating said automatic delivery apparatus,

(b) sensor means (16), which respond to the presence of objects within a forbidden zone comprising a region adjacent to said picture recording device, and

(c) means (34,36) for blocking said automatic delivery apparatus (10), when said sensor means respond to such object.

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4,942,465

## METHOD OF CODING A DIGITAL VIDEO SIGNAL FOR REVERSE REPRODUCTION OF PICTURES

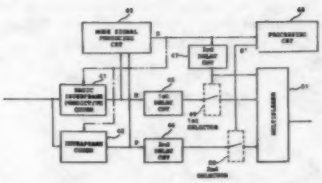
Mutsumi Ohta, Tokyo, Japan, assignor to NEC Corporation, Japan

Filed May 30, 1989, Ser. No. 358,951

Claims priority, application Japan, May 30, 1988, 63-133477

Int. Cl.[5] H04N 7/137

U.S. Cl. 358—133 4 Claims



1. A method of coding a digital video signal by subjecting said digital video signal to redundancy reduction coding, said digital video signal being representative of successive pictures, each comprising a predetermined number of picture elements, said method comprising the steps of:

producing a coding mode signal which indicates, as said redundancy reduction coding, a selected one of interframe coding and intraframe coding which are carried out with reference to a first correlation factor between adjacent ones of said successive pictures and a second correlation factor between the picture elements within each of said successive pictures, respectively;

selectively coding said digital video signal into a first coded signal by carrying out said selected one of the interframe and the intraframe coding in response to said coding mode signal, said first coded signal carrying a first result of said interframe coding and a second result of said intraframe coding;

making said selectively coding step carry out said intraframe coding on a particular element of the picture elements of a current picture to produce a second coded signal when said coding mode signal indicates that said particular element should be subjected to said interframe coding and that a corresponding element of a following picture should be subjected to said intraframe coding, said following picture following said current picture in said successive pictures, said corresponding element corresponding to said particular element; and

multiplexing said first and said second coded signals and said coding mode signal into a multiplexed signal.

4,942,466

## BANDWIDTH COMPRESSION FOR TELEVISION SIGNALS

Charles P. Sandbank, Reigate; Ian Childs, Sutton, and Richard Storey, Lingfield, all of United Kingdom, assignors to British Broadcasting Corporation, London, England

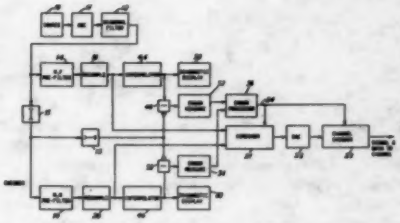
PCT No. PCT/GB86/00799, § 371 Date Oct. 5, 1987, § 102(e) Date Oct. 5, 1987, PCT Pub. No. WO87/04034, PCT Pub. Date Jul. 2, 1987

PCT Filed Dec. 23, 1986, Ser. No. 90,584

Claims priority, application United Kingdom, Dec. 24, 1985, 8531776; Dec. 24, 1985, 8531777; Jul. 16, 1986, 8617320; Sep. 11, 1986, 8621893

Int. Cl.[5] H04N 7/12

U.S. Cl. 358—133 17 Claims



1. A system for transmission of analogue video signals comprising, at a transmitter:

an analogue video signal source;

sampling means for sampling the analogue video signal generated by the source;

bandwidth compression means for compressing the bandwidth of the video signal generated by the source selectively by two or more different methods in response to a control signal, and including sub-sampling means for sub-sampling the sampled analogue video signal generated by the source;

means for converting the sub-sampled, bandwidth compressed video signal into analogue form;

means for transmitting the bandwidth-compressed video signal in analogue form;

control signal generating means responsive to the picture content of the video signal generated by the source to generate the control signal for successive picture areas to command the bandwidth compressing means to select a required one of the bandwidth compression methods for successive picture areas;

and at a receiver;

means for receiving the transmitted bandwidth-compressed video signal;

means for reconstituting a signal for display from the bandwidth-reduced transmitted video signal selectively by two or more different methods in dependence upon picture content;

and means for displaying the reconstituted signal; further including:

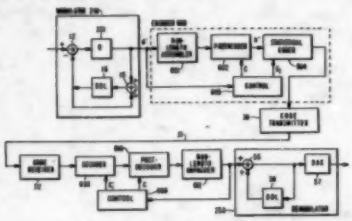
means at the transmitter for transmitting in association with the analogue video signal a digital signal comprising the said control signal; and

means at the receiver responsive to the transmitted digital signal to extract the control signal and command the reconstituting means to select the required one of the reconstituting methods for successive picture areas to reconstitute the signal for display.

## 4,942,467
## PREDICTOR CONTROLLED ENCODER FOR DIGITAL TRANSMISSION SYSTEMS

Harvey Waldman, Yardley, Pa., and Chung H. Lu, Plainsboro, N.J., assignors to General Electric Company, Schenectady, N.Y.

Filed Dec. 5, 1988, Ser. No. 280,053
Int. Cl.[5] H04N 7/137
U.S. Cl. 358—135 15 Claims



1. Transmission apparatus for a television system employing statistical coding of differential pulse code modulation (DPCM), said transmission apparatus comprising:

a source of raster-scanned television signal of differing pixel values;

a differential pulse code modulator for generating a current DPCM signal responsive to said raster-scanned television signal to produce a digitized video signal, said modulator including means for generating an error signal representing the difference between the digitized video signal and a prior prediction signal;

a first encoding table in a plurality n in number of different encoding tables consecutively ordinally number first to nth, each first table comprising for a given pixel value, a range of probability of occurrence values h for each different current DPCM signal value d to generate a first set of output codes from a respective first set of input codes each of certain length which set is ordinally numbered the same as the encoding table generating it;

at least one statistical encoding table for responding to said first set of output codes to generate a second set of codes of variable length;

means responsive to said DPCM signal for deriving a further signal from said error signal, said further signal comprising the prediction for a current DPCM signal sample in each scan line usually based on a sample one line earlier in the DPCM signal; and

means responding to each DPCM and further signal for selecting the one of said n plurality of encoding tables that is most likely to cause said encoding tables to generate a variable-length code of short bit length and to generate such variable-length code in response to said current DPCM and further signals.

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## 4,942,468
## IMAGE INPUT DEVICE

Hisatake Yokouchi; Takakazu Huno, both of Tokyo; Yoichi Onodera, Hachioji; Kouichi Koike, and Masayuki Tsuneoka, both of Kashiwa, all of Japan, assignors to Hitachi Medical Corporation, Tokyo, Japan

Filed Apr. 26, 1989, Ser. No. 343,382
Claims priority, application Japan, Apr. 28, 1988, 63-107360
Int. Cl.[5] H04N 5/05, 7/18
U.S. Cl. 358—138 6 Claims

1. An image input device comprising:

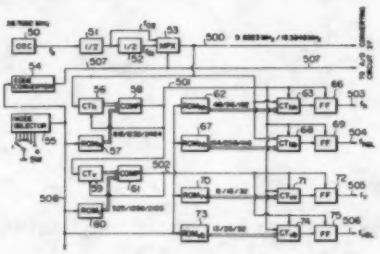
a television camera transforming an image by a line to line scanning into a time sequential video signal;

analogue to digital converting means for sampling successively said video signal and converting it into a digital signal;

image storing means for storing said digital signal;

mode specifying means for generating a mode specifying signal for selecting one of a plurality of sorts of operational modes of said television camera; and

control means including an oscillator generating a main clock; dividing means forming a plurality of sorts of sampling clocks by dividing the main clock coming from said oscillator; selecting means for selecting one of said plurality of sorts of sampling clocks by said mode specifying means to give it to said analogue to digital converting means; and synchronization signal forming means for forming synchronization signals determining horizontal and vertical scanning periods as well as a blanking period in the scanning by counting the sampling clocks thus selected.



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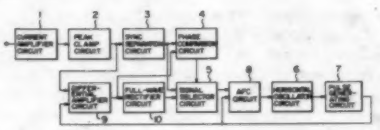
## 4,942,469
## PICTURE DISPLAY APPARATUS

Toshio Kanai, Takatsuki, Japan, assignor to Matsushita Electric Industrial Co., Ltd., Osaka, Japan

Filed Jan. 23, 1989, Ser. No. 299,479
Claims priority, application Japan, Jan. 28, 1988, 63-18027
Int. Cl.[5] H04N 5/08
U.S. Cl. 358—153 2 Claims



2. A picture display apparatus comprising:

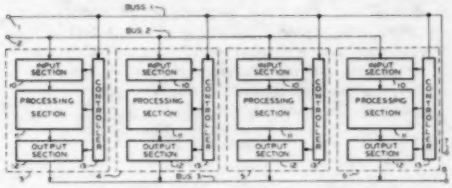
a peak clamp circuit for clamping one of negative and positive peak of an input composite picture signal, a first sync separation circuit for generating a first horizontal synchronizing pulse signal when said composite picture signal clamped by said peak clamp circuit has a signal level which exceeds a predetermined level, a pulse generating circuit for receiving a horizontal synchronizing signal to generate a pulse signal of a given pulse width, a second sync separation circuit for receiving said clamped composite picture signal and the output pulse signal from said pulse generating circuit to extract a second horizontal synchronizing pulse signal from said clamped composite picture signal during the time of occurrence of a pulse in said output pulse signal, and a signal selector circuit for outputting said second horizontal synchornizing signal when said first and second horizontal synchronizing pulse signals are in phase.

4,942,470

## REAL TIME PROCESSOR FOR VIDEO SIGNALS

Takao Nishitani, and Ichiro Tamitani, both of Tokyo, Japan, assignors to NEC Corporation, Japan

Continuation of Ser. No. 135,528, Dec. 17, 1987, abandoned, which is a continuation of Ser. No. 756,027, Jul. 17, 1985, abandoned. This application Jul. 5, 1989, Ser. No. 376,901
Claims priority, application Japan, Jul. 20, 1984, 59-150593; Oct. 30, 1984, 59-228625; Nov. 7, 1984, 59-234545; Nov. 20, 1984, 59-245324
Int. Cl.[5] H04N 5/14
U.S. Cl. 358--160 9 Claims




1. A real time video signal processor for processing video signals such as television signals, said video signals having successive frames, each of said frames comprising a plurality of blocks of video signals, said processor comprising:

a plurality of unit processors, a signal line for supplying a synchronization signal indicating a beginning of the input frame to each of said plurality of unit processors, and a data bus for supplying said video signals to said plurality of unit processors, each of said unit processors comprising:

an input section for receiving said frames and storing a corresponding predetermined one of said plurality of blocks of video signals constituting part of an input one of said frames in response to a predetermined one of a first plurality of position signals indicating the position of said corresponding predetermined one of the plurality of blocks of video signals in the input frame,

a processing section for processing said predetermined one of the blocks of video signals stored in the input section to produce a processed block of video signals, and

an output section for storing the processed block of video signals and outputting the processed block of video signals in response to a predetermined one of a second plurality of position signals indicating the position of the processed block of video signals in an output frame of video signals; and

a control section for supplying, in response to said synchronization signal, the predetermined one of said first and second plurality of position signals.

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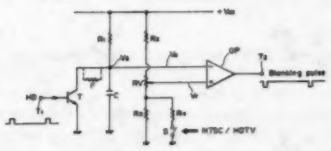
4,942,471

## BLANKING CIRCUIT FOR TELEVISION RECEIVER

Takashi Chikuma, Kanagawa, and Ichiro Tsutsui, Tokyo, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 27, 1989, Ser. No. 385,452
Claims priority, application Japan, Aug. 10, 1988, 63-198094
Int. Cl.[5] H04N 3/24
U.S. Cl. 358—165 12 Claims




1. A blanking circuit for use in a video signal processing circuit of a television receiver for receiving signals according to at least two different broadcast systems having known different numbers of scan lines, respectively comprising:

means for generating a sawtooth waveform signal by resetting a ramp signal periodically with pulses at a horizontal scanning frequency;

means for generating a reference voltage;

means for comparing said sawtooth signal with said reference voltage;

means for selectively changing the relative level of said reference voltage and said sawtooth signal in response to the number of scan lines of the broadcasting system of the received video signal; and

means for supplying the output of said comparing means as a blanking pulse to the video signal processing circuit.

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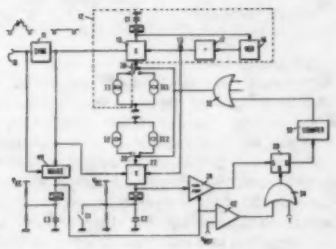
4,942,472

## DETECTION CIRCUIT FOR A VIDEO TAPE RECORDER SIGNAL

Michel Imbert, Seyssins, and Jean-Marc Merval, Saint Egreve, both of France, assignors to SGS-Thomson Microelectronics S.A., Gentilly, France

Filed Dec. 6, 1988, Ser. No. 284,311
Claims priority, application France, Jan. 4, 1988, 88 00168
Int. Cl.[5] H04N 5/04
U.S. Cl. 358—188 15 Claims



1. A circuit for recognizing a signal from a video tape recorder (VTR) supplied to a television set input wherein said signal is selectively supplied from either said VTR or from an off-the-air received TV signal, said input being connected to a line synchronization signal separator (11) for detecting a line synchronization signal from said signal and supplying said line synchronization signal to a phase locked loop (PLL) (12), comprising a first phase comparator (15) and a voltage controlled oscillator (16), designed for regenerating said line synchronization signal supplied by said synchronization signal separator (11), said phase locked loop having a first time constant (I1, C1) corresponding to said-off-the-air received TV signal input, further comprising:

means (20) for switching the PLL to operate using a second time constant (3I1, C1) which is shorter than the first time constant;

a second phase comparator (22) for comparing the phases of signals at input and output terminals of the PLL, said second phase comparator having a third time constant (I2, C2) which is shorter than said first and second time constants; and

a threshold comparator (24) supplying a control signal when the output of the second phase comparator is outside predetermined limits, said switchig means being responsive to said control signal.

**4,942,473**

## INTELLIGENT SCAN IMAGE SENSOR

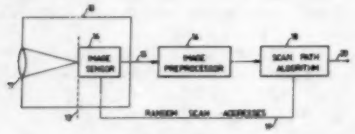
**Yehoshua Y. Zeevi, Haifa; Ran G. Ar, Kiryat Bialik, and Oliver Hilsenrath, Haifa, all of Israel, assignors to Technion Research & Development Foundation, Echnion City, Israel**

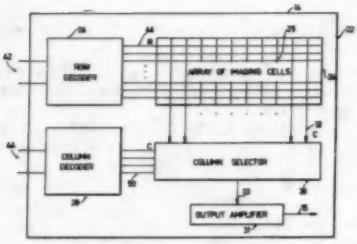
**Filed Jun. 30, 1988, Ser. No. 213,596**

**Claims priority, application Israel, Jul. 16, 1987, 83213**

**Int. Cl.[5] H04N *3/14***

**U.S. Cl. 358—213.26** **20 Claims**




1. A intelligent scan image sensor comprising:

a two-dimensional solid-state array of addressable imaging cell means arranged for exposure to an image, each cell means comprising a photosensitive diode and a sample-and-hold unit, said diode accumulating an electrical quantity having a value in relation to the image light intensity falling thereupon during successive integration periods, said sample and hold unit repeatedly sampling and storing said accumulated quantities as analog video data values at the end of each of said successive integration periods;

row and column selector switch means each respectively associated with one of said two array dimensions; and

video output amplifier means operative with said selector switch means for providing said video data values in random access fashion during a readout operation,

said video data values being selectably gated onto a single output bus of said array by said row and column selector switch means, said single output bus feeding said video output amplifier means wherein said video data values are accessible in said readout operation independent of said repeated sampling operation.

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**4,942,474**

## SOLID-STATE IMAGING DEVICE HAVING PHOTO-ELECTRIC CONVERSION ELEMENTS AND OTHER CIRCUIT ELEMENTS ARRANGED TO PROVIDE IMPROVED PHOTO-SENSITIVITY

**Hajime Akimoto, Hachioji; Shinya Ohba, Kanagawa, and Toshifumi Ozaki, Koganei, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Dec. 8, 1988, Ser. No. 281,220**

**Claims priority, application Japan, Dec. 11, 1987, 62-311910; Mar. 25, 1988, 63-69371**

**Int. Cl.[5] H04N *3/14***

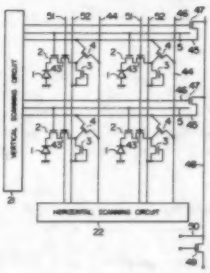
**U.S. Cl. 358—213.11** **30 Claims**

1. A solid-state imaging device comprising:

a plurality of photoelectric conversion elements arranged so as to form a two-dimensional matrix, for storing signal charges corresponding to incident light;

a first signal line for transferring the signal charges of photoelectric conversion elements in a predetermined column, in a column direction;

first switch means for transferring the signal charge stored in one of the photoelectric conversion elements to the first signal line, the first switch means stored in the one photoelectric conversion element into an amplified signal which is either a current signal or a voltage signal and for delivering the amplified signal to the first signal line, selection/-switch means for selecting a predetermined one of the photoelectric conversion elements in the predetermined column to supply the signal charge of the selected photoelectric conversion element to the input part of the amplifier means, and reset means for resetting the electric charge in the input part of the amplifier means;




a second signal line for transferring the signal charge which is supplied from the first signal line, to an output terminal;

second switch means for transferring the signal charge on the first signal line to the second signal line, the second switch means being made up of a plurality of storage means for storing the output charge of the amplifier means at a time the electric charge in the input part of the amplifier means is reset by the reset means and for storing the output charge of the amplifier means at a time the signal charge of the photoelectric conversion element is applied to the amplifier means, and transfer/switch means for transferring the output charges which are stored in plural storage means, successively to the second signal line; and

first and second scanning means for scanning each of the first and second switch means in a predetermined order.

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**4,942,475**

## LIQUID DEVELOPMENT APPARATUS WITH PERFORATED LIQUID CARRIER SHEET

**Ryosuke Uematsu; Kazunori Shindo; Yoshinobu Kariya, and Shinro Oikawa, all of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan**

**Filed Mar. 17, 1989, Ser. No. 324,863**

**Claims priority, application Japan, Mar. 17, 1988, 63-65129; Mar. 17, 1988, 63-65133; Mar. 17, 1988, 63-65134; Jul. 21, 1988, 63-183026; Aug. 22, 1988, 63-209232; Sep. 21, 1988, 63-237750**

**Int. Cl.[5] G03G *15/10***

**U.S. Cl. 355—256** **12 Claims**

1. An apparatus for developing a latent electrotatic images, comprising:

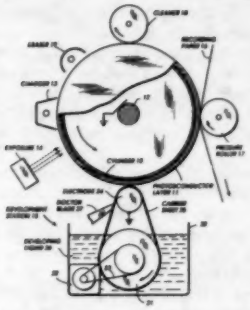
a member having a smooth surface capable of having an electrostatically charged image applied thereto and capable of being driven so that charged image moves past a development zone;

means for applying a latent electrostatic charge image to said surface of said member;

a carrier sheet perforated with a multitude of bores, a por-

tion of said carrier sheet being located in said development zone; and

means for applying a layer of developing liquid under gradually increasing pressure to a first surface of said carrier



sheet so that the applied liquid squeezes through the bores of said portion to and beyond a second, opposite surface of said carrier sheet, said liquid applying means being biased at a potential opposite to said latent electrostatically charged image.

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**4,942,476**

## RECORDING SYSTEM FOR RECORDING ON A ROM IMAGE SIGNAL INFORMATION WHICH HAS BEEN SUBJECTED TO EFFICIENT REDUNDANCY CODING

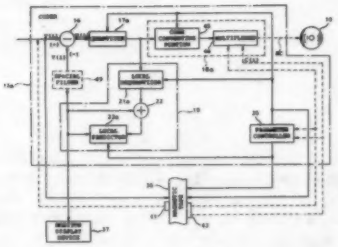
**Toshio Koga; Junichi Ohki; Mutsumi Ohta, all of Tokyo, and Hideto Kunihiro, Osaka, all of Japan, assignors to NEC Corporation and NEC Home Electronics Ltd., both of, Japan**

**Filed May 2, 1988, Ser. No. 189,138**

**Claims priority, application Japan, Apr. 30, 1987, 62-108351**

**Int. Cl.[5] H04N** *5/76, 5/92*

**U.S. Cl. 358—335** **4 Claims**



1. A recording method for recording a sequence of recording signals on a main recording medium in response to a sequence of image signals by carrying out redundancy reduction coding of said image signals with reference to a parameter, said recording method comprising the steps of:

adaptively changing said parameter so that said parameter is rendered as a controlled parameter and performing a redundancy reduction coding of said image signals in accordance with said controlled parameter and thereby producing a sequence of coded signals;

decoding said coded signals to obtain a sequence of decoded signals;

visually displaying said decoded signals on a display device to produce a sequence of images resulting from said decoded signals;

repeating said changing step, said decoding step, and said displaying step until an optimum sequence of images is obtained and designating the controlled parameter corresponding to said optimum sequence of images as an optimum parameter;

recording said optimum parameter on an additional recording medium together with said image signals corresponding thereto;

performing redundancy reduction coding of the image signals read out of said additional recording medium in accordance with said optimum parameter to produce a sequence of optimum coded signals; and

writing said sequence of optimum coded signals together with said optimum parameter into said main recording medium.

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**4,942,477**

## IMAGE PICKUP PRINTING SYSTEM USING NON-NTSC SIGNALS

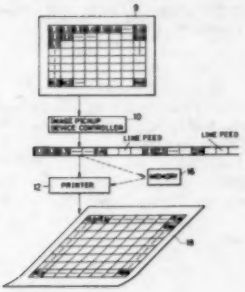
**Shinya Nakamura, Shizuoka, Japan, assignor to Tokyo Electric Co., Ltd., Tokyo, Japan**

**Filed Nov. 10, 1988, Ser. No. 269,706**

**Claims priority, application Japan, Nov. 10, 1987, 62-283697**

**Int. Cl.[5] H04N** *1/40, 1/46*

**U.S. Cl. 358—401** **2 Claims**



1. An image pickup printing system, comprising:

an optical system for focusing an image of an object;

means for converting said image to a plurality of electrical signals being disposed at the focal position of said optical system, said means for converting including a matrix of regions with each region producing one of said plurality of electrical signals;

means for controlling the transfer of said plurality of electrical signals to produce a serial signal formed of serially arranged signals corresponding to rows of said regions with the rows being separated by at least one signal indicating line feed, said serial signal having a format for directly driving a printing means;

memory means connected to said means for controlling for receiving and storing said serial signal;

printing means connected to said memory means and said means for controlling for printing said image wherein the serial signal is selectively received from said memory means and from said means for controlling.

4,942,478

## RECORDING APPARATUS

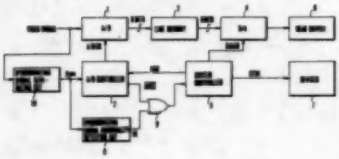
Yoichi Yamagishi, Tokyo, and Makoto Takayama, Kanagawa, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Continuation of Ser. No. 248,317, Sep. 19, 1988, abandoned, which is a continuation of Ser. No. 141,510, Jan. 7, 1988, abandoned, which is a continuation of Ser. No. 907,843, Sep. 16, 1986, abandoned. This application Jun. 27, 1989, Ser. No. 371,994

Claims priority, application Japan, Sep. 19, 1985, 60-205424

Int. Cl.[5] H04N *1/36*

U.S. Cl. 358—409 21 Claims



1. A recording apparatus comprising:

(a) detecting means for detecting an abnormality of a synchronizing signal included in an incoming signal;

(b) processing means for processing said incoming signal into a print recording signal;

(c) print recording means for carrying out print recording in accordance with said print recording signal;

(d) inhibiting means for inhibiting said print recording signal from being supplied to said print recording means when the abnormality of said synchronizing signal is detected; and

(e) means for instructing discharge of the recording medium following the prohibiting operation.

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4,942,479

## IMAGE INFORMATION PROCESSING APPARATUS

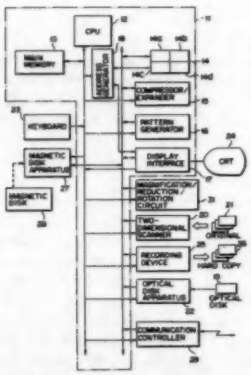
Masayuki Kanno, Fujisawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan

Continuation of Ser. No. 62,495, Jun. 15, 1987, abandoned. This application Apr. 13, 1989, Ser. No. 338,340

Claims priority, application Japan, Jun. 17, 1986, 61-140915

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—448 22 Claims



1. An image information processing apparatus, comprising:

means for obtaining information of a first pixel density by scanning an image;

image information storing means for storing the obtained image information together with pixel density data representing the first pixel density;

means for retrieving the stored image information together with the pixel density data;

means for outputting the retrieved image information, said outputting means having a second pixel density;

conversion factor storing means for storing pixel density conversion factors in both a horizontal and a vertical direction of a view image outputted from said outputting means;

means for reading pixel density conversion factors in both the horizontal and the vertical directions corresponding to the first pixel density of the image information of said image information storing means and the second pixel density of said outputting means from said conversion factor storing means; and

means for converting the first pixel density of the image information in both the horizontal and the vertical directions to the second pixel density of said outputting means according to the pixel density conversion factors read out from said conversion factor storing means.

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4,942,480

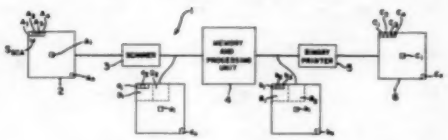
## REPRODUCTION OF HALFTONE ORIGINAL WITH MOIRE REDUCTION AND TONE ADJUSTMENT

Joseph S. Shu, White Plains, N.Y., assignor to Nynex Corporation, White Plains, N.Y.

Filed Sep. 6, 1988, Ser. No. 241,073

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—455 42 Claims



1. A method for use in creating a reproduction of an original image containing screened artwork formed by halftone dots having a predetermined screen frequency and a predetermined halftone dot spacing in a screen direction, the method comprising the steps of:

scanning the original in a scan direction on an element by element basis to form a digital signal for each element indicative of the gray level of the element, said scanning being at a predetermined scanning frequency having a predetemined relationship with respect to the predetermined screen frequency;

storing the digital signals;

and processing the digital signals to develop corresponding processed signals comprising: providing a two-dimensional processing window for processing arrays of said digital signals corresponding to different, non-overlapping arrays of said elements; and for each array of digital signals being processed by said window (i) forming the processed array of signals such that each processed signal is indicative of a first or a second gray level and such that the average of the gray levels signified by the processed array of signals approximates the average of the gray levels signified by the array of digital signals.

4,942,481

## CONTACT-TYPE IMAGE SENSOR

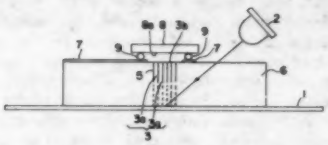
Atsushi Yoshinouchi, Ohjichohon; Masataka Itoh, Nara; Shuhei Tsuchimoto, Nara; Keiji Tarui, Nara, and Satoshi Nishigaki, Nara, all of Japan, assignors to Sharp Kabushiki Kaisha, Osaka, Japan

Filed Jul. 11, 1988, Ser. No. 217,681

Claims priority, application Japan, Jul. 17, 1987, 62-179635; Sep. 30, 1987, 62-247661; Dec. 26, 1987, 62-334622; Dec. 26, 1987, 62-199094

Int. Cl.[5] H04N *1/40*

U.S. Cl. 358—471 2 Claims



1. A contact-type image sensor comprising a light source that illuminates the manuscript to be read; photodetectors that convert the light reflected by the manuscript into an electrical signal; a substrate that is disposed between said photodetectors and said manuscript; an optical fiber array that is constituted by a bundle of optical fibers that are buried in said substrate, said optical fiber array introducing said reflected light from said manuscript into the light-receiving surfaces of said photodetectors; and a light-absorbing substance that is disposed on the outer surface of each of said optical fibers, wherein said light-absorbing substance is disposed on the outer surface of each of the optical fibers, except for the region with a given length from the end of said optical fiber array that faces said manuscript.

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4,942,482

## AUTOMATIC PAGE-TURNING DEVICE

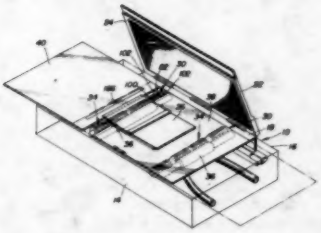
Koichiro Kakinuma, Tokyo, and Minoru Watanabe, Kanagawa, both of Japan, assignors to Sony Corporation, Tokyo, Japan

Filed Jul. 31, 1986, Ser. No. 891,465

Claims priority, application Japan, Aug. 9, 1985, 60-17493; Feb. 20, 1986, 61-36093

Int. Cl.[5] H04H *1/04*

U.S. Cl. 358—474 60 Claims



1. An automatic page-turning device for turning pages of a book or the like as placed in an opened condition to expose a first page to be turned at one side of a spine and a second page in a stack of turned pages at the opposite side of the spine, comprising:

carrier means opposing an outer edge portion of said first page in a first position and being movable to a second position in which said carrier means opposes an outer edge portion of said second page;

means for applying a vacuum to said carrier means in said first position for causing adherence of said first page thereto and the transport of said first page therewith toward said second position;

means associated with said carrier means for isolating said first page from the effect of said vacuum during the travel of said carrier means from said first position toward said second position and thereby releasing said first page from said carrier means;

page guiding means cooperative with said carrier means and movable therewith for receiving said first page as released from said carrier means and carrying said first page at least until said carrier means passes said spine of the book or the like; and

means for withdrawing said first page from said guiding means and stacking the same against said second page during final movement of said carrier means to said second position.

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4,942,483

## MULTI-CHIP TYPE CONTACT IMAGE SENSOR

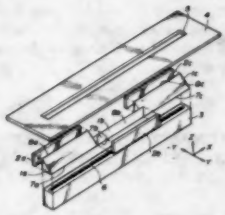
Yukio Kinoshita, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Dec. 21, 1988, Ser. No. 287,141

Claims priority, application Japan, Jan. 14, 1987, 63-4943

Int. Cl.[5] H04H *1/04*

U.S. Cl. 358—484 4 Claims



1. A contact image sensor for reading out data from an original document along a straight line, said sensor comprising:

an optical block having a first surface upon which light is incident from the original document and a plurality of exit surfaces through which the light emerges from the block, said exit surfaces being in spaced-apart relation to each other and the block being constructed with light path dividing means for deviating different rays of the light in respectively different directions so that said different rays are respectively directed to different ones of said exit surfaces, and

a plurality of line sensors separately associated with said exit surfaces.

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4,942,484

## FLOPPY DISK DRIVE WITH CLOSED LOOP SERVOED HIGH DENSITY READ/WRITE GAP, AND WITH LOW DENSITY READ/WRITE GAP FOR THE WRITE UPDATING OF STANDARD OPEN LOOP FORMATTED MEDIUM

Anil K. Nigam, Cupertino, Calif., assignor to Fujitsu America, Inc., San Jose, Calif.

Division of Ser. No. 130,104, Dec. 7, 1987. This application Mar. 30, 1989, Ser. No. 330,903

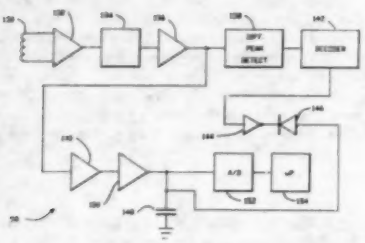
Int. Cl.[5] G11B *5/09*

U.S. Cl. 360—46 8 Claims

1. An electronic circuit for detecting a servo pattern on a disc for use in a disc drive and for locating a single read/write head core relative to a data track, wherein the servo pattern includes plural patterns of alignment transitions for defining data tracks and plural different patterns of timing decode transitions, wherein each of the different patterns of timing

decode transitions has a different time interval between itself and one of the patterns of alignment transitions, said electronic circuit comprising:

first means, using the single read/write head core and the different patterns of timing decode transitions, for detecting and decoding the peaks of the transitions of the plural different patterns of timing decode transitions;



second means, using the single read/write head core and the alignment transitions, for detecting and sampling the amplitude of peaks of transitions of the plural patterns of alignment transitions in order to locate data tracks; and

third means, responsive to said first means, for determining when the second means can begin to detect and sample the amplitude of peaks of transitions of the plural patterns of alignment transitions.

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**4,942,485**

## APPARATUS CAPABLE OF DATA REPRODUCTION FROM DIGITAL TAPE CASSETTES OR LIKE STORAGE MEDIA EMPLOYING TWO DIFFERENT RECORDING METHODS

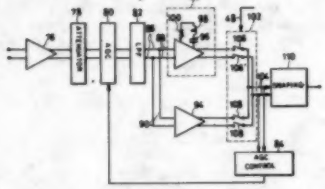
**Shinji Umehara, Kodaira, and Yukinobu Nakamura, Tanashi, both of Japan, assignors to Teac Corporation, Tokyo, Japan**

**Filed Aug. 4, 1988, Ser. No. 228,030**

**Claims priority, application Japan, Aug. 21, 1987, 62-207864**

**Int. Cl.[5] G11B 5/09**

**U.S. Cl. 360—46** **4 Claims**



1. An apparatus for data transfer with first and second tape assemblies on which data are recorded by different methods and which are interchangeably loaded in and unloaded from the apparatus, wherein the improvement comprises:

(a) a transducer for data transfer with the loaded first or second tape assembly, the transducer producing an electrical data signal representative of the data recovered from the first or second tape assembly;

(b) am amplifier connected to the transducer for amplifying the data signal;

(c) a serial connection of common circuit elements connected to the amplifier for processing the amplified data signal representative of the data recovered from both the first and the second tape assemblies, the common circuit elements comprising an attenuator, an automatic gain control, a low pass filter and a shaping circuit which are connected in that order to the amplifier;

(d) a first exclusive circuit element for exclusive use in processing the amplified data signal representative of the data recovered from the first tape assembly;

(e) a second exclusive circuit element for exclusive use in processing the amplified data signal representative of the data recovered from the second tape assembly, the first and second exclusive circuit elements being connected in parallel with each other between the low pass filter and the shaping circuit;

(f) discriminating means for the identifying the loaded tape assembly as the first or the second; and

(g) a selector circuit connected to the discriminating means and actuated thereby for connecting the first exclusive circuit element into serial relation with the common circuit elements when the loaded tape assembly is identified as the first, and for connecting the second circuit element into serial relation with the common circuit elements when the loaded tape assembly is identified as the second, the selector circuit comprising:

(i) first switch means connected between the first exclusive circuit element and the shaping circuit; and

(ii) second switch means connected between the second exclusive circuit element and the shaping circuit, the first and second switch means being selectively actuated by the discriminating means.

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**4,942,486**

## RECORDING DISK HAVING READ-ONLY RECORDING AREA AND WRITABLE RECORDING AREA AND A DRIVING APPARATUS THEREFOR

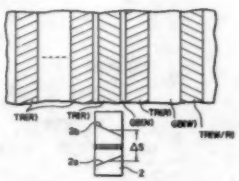
**Ken Kutaragi, Kanagawa; Shoji Tanaka, Tokyo, and Yasushi Fujinami, Kanagawa, all of Japan, assignors to Sony Corporation, Tokyo, Japan**

**Filed Jun. 30, 1988, Ser. No. 214,121**

**Claims priority, application Japan, Jul. 1, 1987, 62-164183**

**Int. Cl.[5] G11B 5/09**

**U.S. Cl. 360—48** **3 Claims**



1. A recording disk comprising:

a magnetic recording medium forming the recording disk;

a read-only track area including a plurality of read-only tracks each separated by read-only guard band;

a writable track area including a plurality of writable tracks, each separated by a write guard band; and

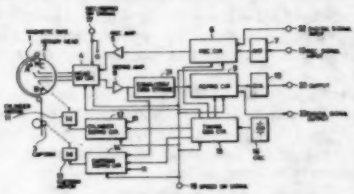
an additional write guard band between a last read-only track in said read-only track area and an adjacent writable track in said writable track area, all of said write guard bands having a selected width wider than said read-only guard bands for preventing erroneous writing into said read-only track area during writing of data into said writable track area.

4,942,487

## APPARATUS FOR RECORDING/REPRODUCING A DIGITAL SIGNAL AT VARIABLE SPEEDS

Takaharu Noguchi, and Takao Arai, both of Yokohama, Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Filed Feb. 19, 1988, Ser. No. 157,795
Claims priority, application Japan, Mar. 13, 1987, 62-56768
Int. Cl.[5] G11B *15/473*
U.S. Cl. 360—77.13 3 Claims



1. An apparatus for recording/reproducing a digital signal on and from a magnetic tape at variable speeds including a normal speed, the apparatus comprising a rotary head including a cylinder having at least two magnetic heads means provided thereon, tracking control means including an automatic track finding circuit for effecting tracking control at the time of reproduction in accordance with tracking signals recorded for each track in a predetermined pattern and at predetermined positions on the magnetic tape and for generating a tracking error signal detected for each track, a revolution speed of a capstan for feeding the magnetic tape being controlled in accordance therewith, feed speed control means for controlling the feed speed of the magnetic tape to be one of N-times normal speed and 1/N-times normal speed at the time of recording/reproduction at one of N-times normal speed and 1/N-times normal speed, where N is an integer greater than one, cylinder control circuit means for controlling the speed of revolution of the cylinder of the rotary head to be one of N-times normal speed and 1/N-times normal speed at the time of recording at one of N-times normal speed and 1/N-times normal speed and for controlling the speed of revolution of the cylinder to be a constant speed at the time of reproduction independently of the operation speed at reproduction, and timing generator circuit means for controlling a processing speed of a recording signal to be one of N-times normal speed and 1/N-times normal speed at the time of recording at one of N-times normal speed and 1/N-times normal speed and for controlling the processing speed of a reproducing signal to be a constant at the time of reproduction independently of the operation speed at reproduction.

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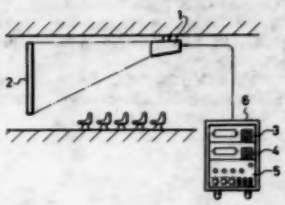
4,942,488

## VIDEO THEATER SYSTEM

Akihisa Osawa, Yokohama, Japan, assignor to Sony Corporation, Tokyo, Japan

Filed Nov. 14, 1983, Ser. No. 551,022
Claims priority, application Japan, Nov. 25, 1982, 57-206763; Nov. 26, 1982, 57-208345; Nov. 30, 1982, 57-209878
Int. Cl.[5] G03B *31/00*
U.S. Cl. 360—80 8 Claims

1. A video theater system, comprising: a video projector; a projector-screen; a video cassette player; a video cassette containing a video tape for playback in the cassette player; a theater controller means for controlling operation of the theater system; and said video tape having a video program and recorded information codes recorded on a plurality of slant tracks in the video, said controller means including information code reader means for generating code signals based on said recorded information codes recorded on said video tracks, wherein said code signals recorded on slant tracks include



command signals to be supplied to said video projector useful in controlling a projection size thereof.

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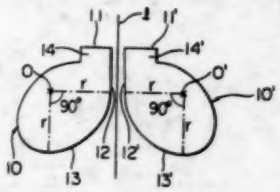
4,942,489

## THIN-FILM MAGNETIC HEAD

Ko Yoneda, Kawasaki; Yasushi Toda; Tooru Matsuda, both of Yokohama; Kenji Makino, and Kenji Nagata, both of Kawasaki, all of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan

Division of Ser. No. 37,870, Apr. 13, 1987, which is a continuation of Ser. No. 641,738, Aug. 17, 1984, abandoned. This application Jan. 5, 1988, Ser. No. 140,786
Claims priority, application Japan, Aug. 24, 1983, 58-153171; Nov. 10, 1983, 58-209827; Dec. 22, 1983, 58-240950
Int. Cl.[5] G11B *5/28*
U.S. Cl. 360—121 4 Claims



1. A thin film magnetic head for simultaneously tracing two tracks, comprising:

a substrate; and

a pair of yokes each being disposed on said substrate and formed by a magnetic thin film, each yoke having a magnetic pole portion and an expanded portion thereof,

wherein each magnetic pole portion is spaced from said substrate to form a magnetic gap disposed between said substrate and each magnetic pole portion, and

wherein the cross sectional area of each expanded portion taken through a plane perpendicular to the top surface of said expanded portion is larger than the cross sectional area of said magnetic pole portion taken through a plane perpendicular to the top surface of said magnetic pole portion, and wherein the distance between said pair of expanded portions increases as the distance from said magnetic pole portions increases.

**4,942,490**

## THIN LAYER MAGNETIC READ/WRITE HEAD

**Jean-Claude Lebureau, Sainte Genevieve des Bois, France, assignor to Thomson-CSF, Paris, France**

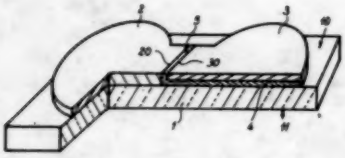
**PCT No. PCT/FR87/00424, § 371 Date Aug. 18, 1988, § 102(e) Date Aug. 18, 1988, PCT Pub. No. WO88/03307, PCT Pub. Date May 5, 1988**

**PCT Filed Oct. 28, 1987, Ser. No. 221,455**

**Claims priority, application France, Oct. 28, 1986, 8614974**

**Int. Cl.[5] G11B *5/12***

**U.S. Cl. 360—126** **4 Claims**



1. A thin layer magnetic write/read head, comprising:

a substrate having a main side;

a first magnetic circuit pole located on said main side and having a first flank portion forming a first angle with said main side;

a second magnetic circuit pole located on said main side with a layer of non-magnetic material located between said second pole and said main side wherein said second pole further comprises a second flank portion which second flank portion forms a second angle with said main side whereby said second angle is supplementary to said first angle to thereby define a gap of substantially constant thickness between said first and second flank portions, said gap containing non-magnetic material.

**4,942,491**

## MAGNETIC HEAD SUPPORTING DEVICE

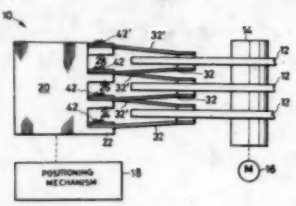
**Tsuyoshi Osawa, Tanashi, and Yasuo Yagami, Tokyo, both of Japan, assignors to Teac Corporation, Tokyo, Japan**

**Filed Aug. 31, 1988, Ser. No. 238,828**

**Claims priority, application Japan, Sep. 7, 1987, 62-136535**

**Int. Cl.[5] G11B *5/48***

**U.S. Cl. 360—104** **2 Claims**




1. In a data transfer apparatus having a stacked array of double sided magnetic disks rotatable about a common axis, a head supporting device which can be easily and accurately assembled by a single tool such as a screwdriver, the head supporting device comprising:

(a) a unitary support structure having a row of ledges projecting therefrom, the ledges being spaced from each other in a direction parallel to the axis of rotation of the magnetic disk;

(b) there being first and second rows of mounting holes formed in the ledges, each row of mounting holes being offset from one another and being aligned in a direction parallel to the axis of rotation of the magnetic disks;

(c) a plurality of fastener elements;

(d) a first set of head/arm assemblies each including a first arm having a proximal end fastened to one ledge on the support structure by one fastener element received in one of the first row of mounting holes, each first arm carrying on a distal end thereof a first magnetic head for data transfer with a first side of one magnetic disk; and

(e) a second set of head/arm assemblies each including a second arm having a proximal end fastened to one ledge on the support structure by one fastener element received in one of the second row of mounting holes, each second arm carrying on a distal end thereof a second magnetic head for data transfer with a second side of one magnetic disk;

(f) whereby each of the first and second set of head/arm assemblies can be successively fastened to the ledges on the support structure with the fastener elements by inserting an associated tool into and through the aligned mounting holes in the other ledges.

**4,942,492**

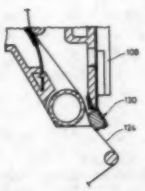
## WIPING DEVICE FOR MAGNETIC TAPE CASSETTES

**Ay C. Che, No. 1-4, Alley 44, Lane 149, Kuo Ching Rd., Pan-Chiao, Taipei Hsien, Pan-Chiao, Taiwan**

**Continuation-in-part of Ser. No. 35,902, Apr. 8, 1987, abandoned. This application Dec. 13, 1988, Ser. No. 283,630**

**Int. Cl.[5] G11B *23/02***

**U.S. Cl. 360—132** **12 Claims**



1. A wiping device for a magnetic tape cassette, which cassette is adapted for inserting into a magnetic recording and reproducing apparatus and for removing from said apparatus, and includes a generally rectangular box-like housing formed by an upper case section and a mating lower case section disposed in opposing relation and secured together to define a generally enclosed chamber, a supply reel and a take-up reel supported within said chamber between said case sections for rotation on parallel spaced axes, and a magnetic tape having a magnetizable surface, said magnetic tape being wound on said supply reel and having a leading end portion connected to said take-up reel, said device comprising:

an elastic main body, securing means on said main body copperable with means on said housing so that said main body can be mounted to and removed from said housing of said magnetic tape cassette from the outside of said housing without dismantling said secured upper and lower case sections; and

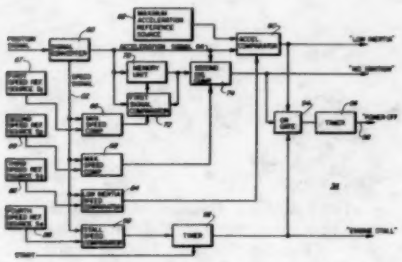
wiping means supported by said main body and having a curved operation surface, when said main body is mounted to said housing, and said magnetic tape is arranged to an operation position by said apparatus, said magnetizable surface of said magnetic tape contacting an effective area of said curved operation surface, and when said magnetic tape is in said operation position and is moved by said apparatus, said magnetic tape exerting an urging force to said wiping means, and said elastic main body urging said wiping means to exert a predetermined urging pressure to said magnetic tape against said urging force, so that said effective area of said curved operation surface can substantially snugly contact said magnetizable surface.

4,942,493

## METHOD AND APPARATUS FOR DETECTING PRIME MOVER START MALFUNCTION

Gregory I. Rozman, and Paul G. Baits, both of Rockford, Ill., assignors to Sundstrand Corporation, Rockford, Ill.

Filed Nov. 2, 1988, Ser. No. 265,953
Int. Cl.[5] H02H 5/00
U.S. Cl. 361—23 14 Claims



7. A method of detecting when a motor is disconnected from a load, comprising the steps of:

sensing speed and acceleration of the motor;

comparing the acceleration of the motor above a certain speed to a maximum acceleration; and

developing a signal to indicate that the motor is disconnected from the load when the acceleration of the, motor above the certain speed is greater than the maximum acceleration.

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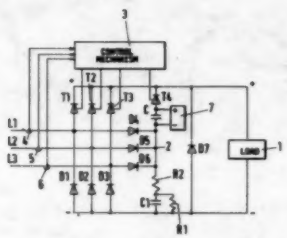
4,942,494

## SHORT-CIRCUIT PROTECTOR FOR A HALF-CONTROLLED THREE-PHASE BRIDGE

Jan Fabianowski, Küsterkamp 3, D-4600 Dortmund; Robert Ibach, Kleeweg 9, D-5840 Schwerte, and Georg Gierse, Am Herrenbusch 6, D-5810 Witten, all of Fed. Rep. of Germany

Filed Oct. 6, 1989, Ser. No. 418,397
Claims priority, application Fed. Rep. of Germany, Oct. 10, 1988, 3834412
Int. Cl.[5] H02H 3/08
U.S. Cl. 361—93 2 Claims



1. Short-circuit protector for a three-phase bridge, comprising a half-controlled three-phase bridge having bridge thyristors in a cathode group, diodes, and a common output, a free-wheeling diode in a load circuit, said free-wheeling diode being connected in parallel with said half-controlled three-phase bridge, a control mechanism for driving said bridge thyristors, and a plurality of additional diodes having cathodes and supplementing said half-controlled three-phase bridge to form a complete rectifier bridge, a series-circuit of a resistor and a capacitor with a parallel discharge resistor being connected between said common output and a common negative potential, a further capacitor connected to the cathodes of said additional diodes, an external direct-voltage source for charging said further capacitor, and a further thyristor to be driven by said control mechanism, said further thyristor being connected in series with said further capacitor and having a cathode connected to the cathodes of said bridge thyristors.

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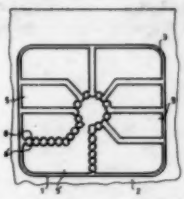
4,942,495

## ELECTROSTATIC PROTECTION DEVICE FOR ELECTRONIC CARDS

Philippe Peres, Gardanne, and Vincent Devesud, Trets, both of France, assignors to Gemplus Card International, Aix En Provence, France

Filed Oct. 21, 1988, Ser. No. 261,176
Claims priority, application France, Oct. 23, 1987, 87 14669
Int. Cl.[5] H05F 3/02
U.S. Cl. 361—220 2 Claims



1. An electronic card having a module comprising

an insulating support (3) carrying, on one of its faces, a network of conducting tracks (4) and, on the other face, electrical contacts (5—5') accessible from the outside placed so that each conducting track (4) is connected to a contact (5) and so that each contact (5) is close to a contact (5') at a reference potential:

at least one integrated circuit (6), the input and output terminals of which (7) are connected to the network of conducting tracks (4), the contact at the reference potential (5') bears, on its periphery, one or more metal protuberances (8') facing other metal protuberances (8) borne by the other contacts (5) so as to protect the integrated circuit or circuits against electrostatic discharges; the distance between two facing protuberances (8—8') is smaller than the nominal distance between the contact carried to the reference potential (5') and the other contacts (5); the contacts (5 and 5') have several of said protuberances (8 and 8'), said protuberances having ends facing each other and the distance between the facing ends of said protuberances (8 and 8') is less than 100 micrometers; and wherein said reference potential contact (5') has a portion with said plurality of protuberances which is centrally located, and the electrical contacts (5) are located with their protuberances facing the plurality of protuberances surrounding said centrally located portion.

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4,942,496

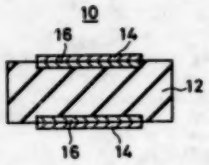
## CERAMIC CAPACITOR AND MANUFACTURING METHOD THEREOF

Hajime Arakawa; Osamu Yamaoka; Kazuyuki Kubota; Motoaki Kakio; Yoshimasa Azuma, and Mitsuru Nagashima, all of Nagaokakyo, Japan, assignors to Murata Manufacturing Co., Ltd., Japan

Filed Feb. 28, 1989, Ser. No. 316,653
Claims priority, application Japan, Feb. 29, 1988, 63-47765
Int. Cl.[5] H01G 4/10, 7/00
U.S. Cl. 361—321 11 Claims

1. A ceramic capacitor comprising a dielectric ceramic element formed of at least a metal oxide as a main ingredient and electrodes formed on the surface of said dielectric ceramic

element, the capacitor having reduced layers underneath said electrodes on the surface of said dielectric ceramic element, wherein said reduced layers are formed by reducing the surface of said dielectric ceramic element by means of applying and subsequently baking on the surface of said dielectric ceramic element an electrode material with a metal having a stronger oxidizing tendency than the mentioned metal oxide.

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4,942,497

## COOLING STRUCTURE FOR HEAT GENERATING ELECTRONIC COMPONENTS MOUNTED ON A SUBSTRATE

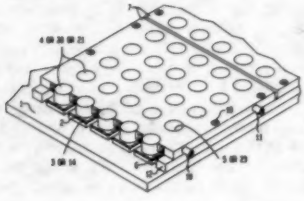
Shinji Mine, and Terumi Shimonishi, both of Tokyo, Japan, assignors to NEC Corporation, Tokyo, Japan

Filed Jul. 21, 1988, Ser. No. 222,818

Claims priority, application Japan, Jul. 24, 1987, 62-185182; Jul. 29, 1987, 62-189201; Aug. 19, 1987, 62-204168; Oct. 15, 1987, 62-157800

Int. Cl.[5] H05K 7/20

U.S. Cl. 361—385 7 Claims



1. A cooling structure comprising:

heat generating electronic components mounted on a substrate;

a cold plate fixed on said substrate which is provided with cold plate through holes opposed to the respective upper surfaces of said heat generating electronic components;

flow paths formed within said cold plate for circulating a coolant;

an inlet provided on a side of said cold plate for supplying said coolant into said flow paths;

an outlet provided on a side of said cold plate for exhausting said coolant from said flow paths; and

pistons inserted through and held wi thin respective said cold plate through holes so that the lower surfaces of said pistons come into thermal contact with said upper surfaces of said heat generating electronic components.

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4,942,498

## FIXATION DEVICE WITH ADJUSTABLE TILTING

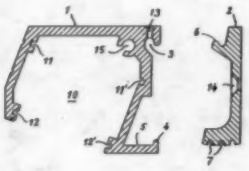
Daniel Tousseaint, Spa, Belgium, assignor to Belgian Electronic Research S. A., Belgium

Filed Aug. 17, 1988, Ser. No. 233,138

Claims priority, application Belgium, Jun. 30, 1988, 8800756

Int. Cl.[5] H05K 7/20

U.S. Cl. 361—388 33 Claims



1. A device for mounting an apparatus, comprising:

a first element serving as a mounting frame for the apparatus;

a suspension element adapted for rigid attachment to a support surface;

means for rotatably connecting said first element to said suspension element; and

means for preselecting the angular position of said first element with respect to said suspension element, said preselecting means including means for holding said first element at a preselected angular position with respect to said suspension element.

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4,942,499

## WIRE HARNESS COUPLER INSTRUMENT PANELS

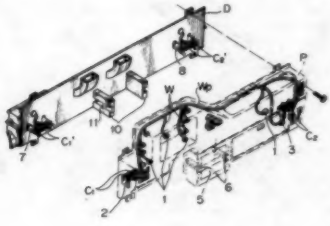
Tatsumi Shibata; Hideharu Hayashi; Yukio Muramatsu, and Masaki Yamamoto, all of Shizuoka, Japan, assignors to Yazaki Corporation, Tokyo, Japan

Filed Mar. 23, 1989, Ser. No. 327,672

Claims priority, application Japan, Mar. 25, 1988, 63-38426[U]

Int. Cl.[5] H02B 1/04

U.S. Cl. 361—428 5 Claims



1. A wire harness coupling unit for use on a vehicular instrument panel comprising;

a first wire harness on the vehicle body, mounted on a dashboard of said vehicle and having a plurality of connectors at terminal ends thereof;

a second wire harness mounted on an instrument panel of said vehicle and having a plurality of connectors at terminal ends thereof;

a male coupler member carrying connectors of one of said first and second wire harnesses and including a first bracket securely mounted to one of said dashboard and said instrument panel corresponding to said wire harness carried thereon, said first bracket having apertures for securely holding connectors of one of said first and second wire harnesses; and

a female coupler member carrying connectors of the other one of said first and second wire harnesses being in in face-to-face relation with said male coupler member, and including a second bracket securely mounted to the other of said dashboard and said instrument panel corresponding to said other wire harness carried thereon, said second bracket being positioned opposite said first bracket of said male coupler member for engagement therewith, further said second bracket having apertures for securely holding connectors of the other of said first and second wire harnesses,

said connectors of at least one of said first and second wire harnesses being movably fitted in said male and female coupler members, and, interengaging guide means independently provided on said dashboard and said instrument panel, aligning flexible clips on one of said first and second brackets, said clips engaging portions of the other of said first and second brackets, whereby

said male and female coupler members are engaged with each other with said instrument panel assembled onto said dashboard and thereby couple said connectors of said first wire harness with corresponding connectors of said second wire harness.

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**4,942,500**

## CAPACITOR TANTALUM SURFACE FOR USE AS A COUNTERELECTRODE DEVICE AND METHOD

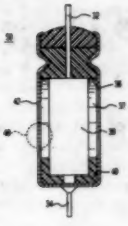
**Stuart E. Libby, Bennington, Vt.; William J. Lindskog, Clarksburg, Mass., and Gilbert Green, Jr., Bennington, Vt., assignors to Tansitor Electronics, Inc., Bennington, Vt.**

**Continuation-in-part of Ser. No. 218,635, Jul. 13, 1988, abandoned, which is a continuation of Ser. No. 133,547, Dec. 16, 1987, Pat. No. 4,780,797. This application Dec. 12, 1988, Ser. No. 319,556**

**The portion of the term of this patent subsequent to Oct. 25, 2005, has been disclaimed.**

**Int. Cl.[5] H01G *9/00***

**U.S. Cl. 361—516** **12 Claims**



1. In an electrolytic capacitor comprising a porous tantalum anode, a liquid electrolyte, and a metal container cathode, said cathode having an inherently high effective capacitance inner tantalum surface, the improvement comprising an alloy layer formed over the tantalum surface, said alloy layer comprising tantalum and a platinum family metal.

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**4,942,501**

## SOLID ELECTROLYTE CAPACITORS AND METHODS OF MAKING THE SAME

**Douglas R. MacFarlane, Elsternwick; Arthur K. Philpott, Neerim South, and John R. Tetaz, Templestowe, all of Australia, assignors to Specialised Conductives Pty. Limited, Neerim South, Australia**

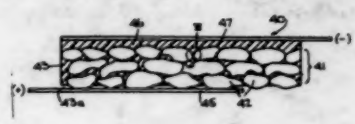
**Filed Apr. 28, 1988, Ser. No. 187,239**

**Claims priority, application Australia, Apr. 30, 1987, PI1684**

**Int. Cl.[5] H01G *9/00***

**U.S. Cl. 361—523** **73 Claims**

1. A compact electrolytic capacitor including an electrically conductive anode, an electrically conductive cathode, and an electrolyte between said anode and said cathode; characterized in that said electrolyte is in the form of an ultrathin layer of a solid solution of (a) at least one ionically conducting salt selected from the group consisting of alkali metal salts, transition



metal salts and ammonium salts of (b) at least one acid selected from the group consisting of monobasic, dibasic and tribasic acids other than haloid acids (c) in an ionically conducting polymer of high solvation power.

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**4,942,502**

## LIGHT PROJECTING TOY MUSICAL BOX

**Michiya Ohashi, Tokyo, Japan, assignor to Tomy Company, Ltd., Toyko, Japan**

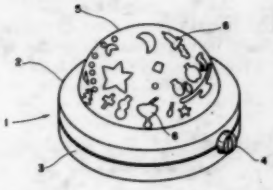
**Continuation of Ser. No. 258,528, Aug. 31, 1988, Pat. No. 4,858,079. This application Jul. 18, 1989, Ser. No. 381,390**

**Claims priority, application Japan, Nov. 16, 1987, 62-174583; Jan. 27, 1988, 63-9094**

**The portion of the term of this patent subsequent to Aug. 15, 2006, has been disclaimed.**

**Int. Cl.[5] F21V *21/30*; A63H *1/28***

**U.S. Cl. 362—35** **25 Claims**



1. A light projecting toy musical box comprising:

a base;

a dome movably mounted on the base and being substantially translucent;

a lamp disposed within the base and projecting light through the dome;

an acoustic mechanism, disposed within the base, for generating musical sound; and

drive means, disposed within the base, for simultaneously moving the dome and actuating the acoustic mechanism, wherein the base is made of an upper shell member and a lower shell member, and

wherein the dome includes a base portion and a flange which extends radially outwardly from the base portion, and the upper and lower shell members define an annular groove for receiving the flange and mounting the dome for rotational movement on the base.

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**4,942,503**

## GASEOUS DISCHARGE TUBE AND POWER SUPPLY ASSEMBLY

**Harold W. Lyons, Killingworth, Conn., assignor to Minnesota Mining and Manufacturing Company, St. Paul, Minn.**

**Filed Apr. 28, 1989, Ser. No. 345,000**

**Int. Cl.[5] B60Q *1/52***

**U.S. Cl. 362—74** **7 Claims**

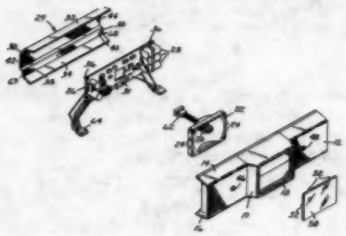
1. An assembly for mounting on a lightbar including:

an elongated U-shaped channel member having two legs and a portion which joins said legs, means for attaching said member to said lightbar, and a hollow protrusion extend-

ing from said U-shaped channel member at said portion, said hollow protrusion having an opening;

a first subassembly secured within said hollow protrusion at said opening including a gaseous discharge tube and a reflector for said gaseous discharge tube;

a second subassembly including a U-shaped support member, a circuit board having a circuitry for operation of said gaseous discharge tube removably secured to said support member, said support member removably secured to said U-shaped channel member with said circuit board positioned generally parallel to a portion of the U-shaped support member connecting two legs of the U-shaped support member.



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**4,942,504**

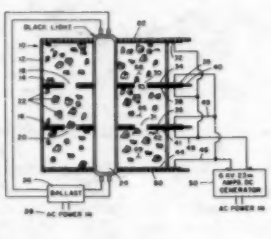
## ELECTROSTATIC DISPLAY DEVICE

**Gregory R. Brotz, P.O. Box 1322, Sheboygan, Wis. 53081**

**Filed Feb. 6, 1990, Ser. No. 475,910**

**Int. Cl.[5] F21S *3/00***

**U.S. Cl. 362—84** **7 Claims**



1. An electrostatic display device comprising:

a viewing chamber having at least one transparent side;

an upper electrostatic plate having an electric charge;

a lower electrostatic plate having an opposing charge from the charge of said upper electrostatic plate;

means for producing blacklight to illuminate said viewing chamber;

a plurality of electrostatically charged fluorescent particles; and

means for generating an electric current to said upper and lower electrostatic plates causing said particles to be attracted to the electrostatic plate opposite of said particles, said particles acquiring the charge of such electrostsatic plate to be then repelled and attracted to said electrostatic plate of opposing charge where said particles then change their charge to the same charge of that electrostatic plate where said particles are again repelled and attracted to the electrostatic plate of opposing charge, such process of changing charges continuing, causing the particles to move within said chamber as said particles are illuminated by said blacklight.

**4,942,505**

## MINIATURE FLASHLIGHT

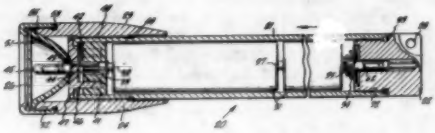
**Anthony Maglica, Ontario, Calif., assignor to Mag Instrument, Inc., Ontario, Calif.**

**Continuation of Ser. No. 222,378, Jul. 19, 1988, Pat. No. 4,899,265, which is a continuation of Ser. No. 034,918, Apr. 6, 1987, abandoned, which is a continuation of Ser. No. 828,729, Feb. 11, 1986, Pat. No. 4,658,336, which is a continuation of Ser. No. 648,032, Sep. 6, 1984, Pat. No. 4,577,263. This application May 23, 1989, Ser. No. 356,361**

**The portion of the term of this patent subsequent to Mar. 18, 2003, has been disclaimed.**

**Int. Cl.[5] F21L *7/00***

**U.S. Cl. 362—187** **17 Claims**



16. A miniature flashlight comprising:

a lamp bulb;

a barrel for retaining a battery source of power therein, said barrel being in electrical communication with the battery source of power when said lamp bulb is energized;

means for retaining said lamp bulb adjacent one end of said barrel;

a head assembly including a light transmitting lens and a beam forming reflector, said assembly being controllably translatable along said barrel in response to rotation thereof relative to said barrel; and

switch means disposed adjacent said one end of said barrel for opening an electrical contact between said lamp bulb and said barrel to de-energize said lamp bulb in response to relative movement of said head assembly in an axial direction toward said barrel, at least a portion of said switch means being axially movable with respect to said barrel such that axial movement of said head assembly towards said barrel in response to relative rotation thereof causes axial movement of said portion of said switch means to open said electrical contact and wherein rotational movement of said head assembly with respect to said barrel additionally varies the relative positional relationship between the reflector and the lamp bulb thereby providing an adjustable focus of light emission from the flashlight lens when the lamp bulb is energized.

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**4,942,506**

## ELECTRICAL LIGHT ILLUMINATION FOR KITES FLOWN AT NIGHT

**Mark T. Flory, 7214 Gaston, #219, Dallas, Tex. 75214**

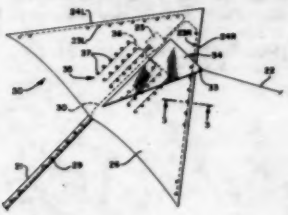
**Filed Feb. 13, 1989, Ser. No. 309,190**

**Int. Cl.[5] A63H *27/08***

**U.S. Cl. 362—253** **9 Claims**

1. An electric light illumination system for kites flown in the hours of darkness at night comprising: kite mounted electrical power source; lighting means mounted on the kite; circuit means connected to said lighting means; and interconnect means for selectively connecting said circuit means to said kite mounted electrical power source; wherein said lighting means includes a plurality of electric lights in said circuit means; said interconnect means includes a switching structure capable of switching electric power to lights of said plurality of lights;

said switching structure is connected to, and controlled by, computer control means; and wherein a radio receiver is included in the system mounted on a kite connected to said switching structure.



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**4,942,507**

**REFLECTOR FOR DENTAL AND SURGICAL OPERATING ROOM LIGHTING FIXTURES**

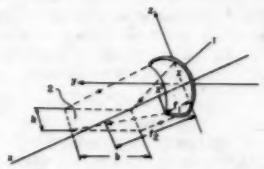
**Harry Wagener, Alfeld/Leine, Fed. Rep. of Germany, assignor to AUER-SOG Glaswerke GmbH, Bad Gandersheim, Fed. Rep. of Germany**

**Continuation-in-part of Ser. No. 119,510, Nov. 12, 1987, abandoned. This application Apr. 14, 1989, Ser. No. 338,540**

**Claims priority, application Fed. Rep. of Germany, Nov. 12, 1986, 3638669**

**Int. Cl.[5] F21V 7/09**

**U.S. Cl. 362—296** **6 Claims**



1. A reflector for dental and surgical operating room lighting fixtures which, in a spatial Cartesian coordinate system with axes x, y, z, in which x represents the optical axis of the reflector, has an elliptic shape in the plane $y=0$ and a parabolic shape in the plane $z=0$, with the parabolic shape having a focal point which coincides substantially with a closer focal point $f_1;0;0$ of the ellipse so that the latter defines a common focal point and light beams that come from the common focal point and strike the reflector in the planes $y=0$ and $z=0$, in a plane $x=f_2$ pass through a focal line $x=f_2$; $z=0$, the reflector being so constructed that, in the areas spaced from the optical axis $y=0$; $z=0$, the reflector includes distortions in the surface thereof so that light beams coming from the area of the common focal point and reflected outside planes $y=0$ and $z=0$ pass through the plane $x=f_2$ within a desired approximately rectangular light field and have distances from the focal line so that an essentially uniform light density is present in the light field; the shape of the reflector being determined by the equations:

$$x=\frac{y^2}{4\cdot f_1}+\frac{f_1+f_2}{2}\cdot\left(1-\sqrt{1-\frac{z^2}{f_1\cdot f_2}}\right),$$

wherein:

-continued

$$\frac{f_1+f_2}{2}=a;\ \text{and}\ \sqrt{f_1\cdot f_2}=b;\ 2f_1=p$$

$$x=\frac{y^2}{2p}+a\cdot\left(1-\sqrt{1-\frac{z^2}{b^2}}\right);$$

in which p is the parameter of the parabola $y=2px$ resulting in the plane $z=0$ and a and b are the large and the small semiaxis, respectively, of the ellipse resulting in the plane $y=0$.

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**4,942,508**

**SWITCHING REGULATOR**

**Shigeo Nakamura, Yamanashi, Japan, assignor to Fanuc Ltd, Minamitsuru, Japan**

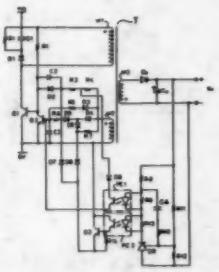
**PCT No. PCT/JP88/01059, § 371 Date May 30, 1989, § 102(e) Date May 30, 1989, PCT Pub. No. WO89/04083, PCT Pub. Date May 5, 1989**

**PCT Filed Oct. 18, 1988, Ser. No. 363,515**

**Claims priority, application Japan, Oct. 29, 1987, 62-274404**

**Int. Cl.[5] H02M 3/338, 3/28**

**U.S. Cl. 363—19** **3 Claims**



1. A switching regulator for controlling an output voltage by using a pulse width of a switching element such as a translator at a primary side of the switching regulator, comprising:

a speed-up capacitor located at the primary side of the switching regulator;

a capacitor operatively connected to the transistor;

a first feedback element, operatively connected to said capacitor and the transistor, for converting an output voltage at a secondary side into a feedback current, for controlling an amount of charge on said capacitor to control a time for which the transistor at the primary side is kept on, and for controlling an amount of charge of said speed-up capacitor; and

a second feedback element, operatively connected to said speed-up capacitor and said capacitor, for suppressing a discharge current from said speed-up capacitor and said capacitor and decreasing on-time of the transistor to decrease the output voltage when the output voltage is high.

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**4,942,509**

**CONTROL ARRANGEMENT FOR A SWITCH MODE POWER SUPPLY**

**Jonathanes Shires, and John Turner, both of Wetherby, England, assignors to Farnell Instruments Limited, Wetherby, United Kingdom**

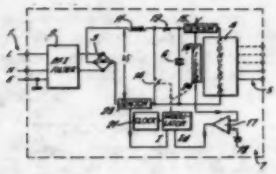
**Filed Mar. 28, 1989, Ser. No. 329,450**

**Int. Cl.[5] H02M 3/335**

**U.S. Cl. 363—89** **10 Claims**

1. A control arrangement for interfacing a main converter in a switched mode power supply with a full wave rectified mains power supply, the control arrangement receiving an average input voltage $V_f$ having a rectified sinusoidal waveform from

the rectified mains supply and providing an average output d.c. voltage $V_o$ as the input to the main converter, and comprising a voltage converter having an inductance, a switching means to connect the inductance across said input voltage, and a control means determining the average input current I to the voltage converter and operable to control a switching duty



ratio D of the switching means in dependence thereon, wherein the voltage converter has a voltage transfer function which is a function f(D) of the duty ratio, and said control means is arranged so that f(D) is substantially inversely proportional to I so that the average input current has substantially the same waveform as said average input voltage.

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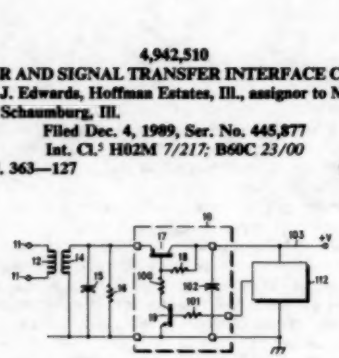
**4,942,510**

**POWER AND SIGNAL TRANSFER INTERFACE CIRCUIT**

**Arthur J. Edwards, Hoffman Estates, Ill., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Dec. 4, 1989, Ser. No. 445,877**
**Int. Cl.[5] H02M *7/217*; B60C *23/00***
**U.S. Cl. 363—127** **9 Claims**



1. An interface circuit for providing a power source to a functional circuit block from a coupled alternating excitation source and a return transmission path from said block to said source comprising:

a transistor,

associated switch means, and

energy storage means,

said transistor having a forward mode of operation, wherein it serves to rectify forwardly coupled excitation energy to thereby charge said energy storage means as said power source, and

a reverse mode of operation wherein energy stored in said storage means is discharged to provide a back coupled pulse,

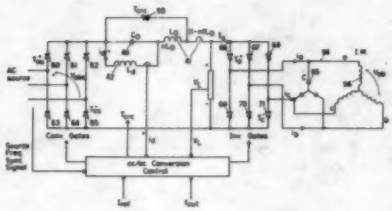
said switch means being adapted to cooperate with said functional circuit block to controllably activate said reverse mode to provide said return transmission.

**4,942,511**

**STATIC POWER CONVERSION APPARATUS USING A HIGH FREQUENCY SERIES RESONANT DC LINK**

**Thomas A. Lipo, Madison, Wis., and Yoshihiro Murai, Seki, Japan, assignors to Wisconsin Alumni Research Foundation, Madison, Wis.**

**Filed Sep. 28, 1989, Ser. No. 414,202**
**Int. Cl.[5] H02M *7/521***
**U.S. Cl. 363—136** **13 Claims**



1. A power converter for converting DC power to AC power comprising:

(a) a DC series resonant link circuit having a capacitor adapted to receive a DC power input, a first inductor connected in series with the capacitor, a second inductor connected in parallel with at least the capacitor, and a DC current bus providing the output current from the resonant circuit;

(b) means for causing the resonant circuit to oscillate stably at or near its resonant frequency and for the current on the DC current bus to be maintained at a desired average DC level and to go to zero current at least once during each cycle of oscillation of the resonant circuit; and

(c) an inverter connected to receive the current on the DC bus and having gated switching devices which are switched on and off only when the current on the DC bus feeding the inverter is substantially zero.

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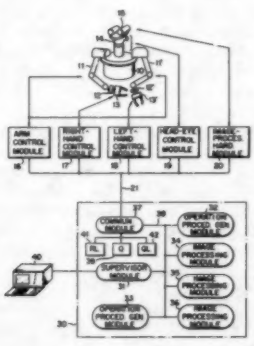
**4,942,512**

**CONTROL METHOD OF ROBOT SYSTEM AND APPARATUS FOR REALIZING THE SAME**

**Yoshiaki Kohno, Yokohama, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed May 19, 1988, Ser. No. 196,063**
**Claims priority, application Japan, May 21, 1987, 62-124604**
**Int. Cl.[5] G06F *3/04***
**U.S. Cl. 364—133** **9 Claims**



6. A robot system, comprising:

a plurality of modules, each module capable of acting as a

source module of a message and as a destination module of a message, each module including means for generating transmission requests and for generating messages to be sent to other modules, and

a commander in communication with the plurality of modules, including:

means for receiving the transmission requests and messages from the modules,

a sequential list memory for storing the received transmission requests in sequential order,

a plurality of queue buffers, corresponding to the plurality of modules, capable of storing the messages to be sent to particular destination modules in the buffers corresponding to the particular destination modules, and

means for transmitting one messages from each of the queue buffers to the destination modules corresponding to the queue buffers, in a predetermined order.

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**4,942,513**

## TROUBLE DIAGNOSIS APPARATUS FOR CONTROLLED DEVICE

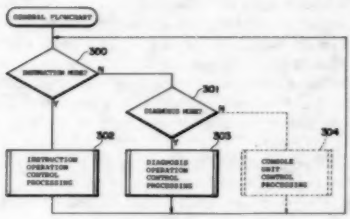
**Makio Sakano, Ibaraki, and Kiyoto Hirase, Sunto, both of Japan, assignors to Omron Tateisi Electronics Co., Kyoto, Japan**

**Filed May 24, 1988, Ser. No. 197,914**

**Claims priority, application Japan, May 25, 1987, 62-127753; May 25, 1987, 62-127754; May 25, 1987, 62-127756**

**Int. Cl.[5] G06F *15/46, 11/00***

**U.S. Cl. 364—184** **4 Claims**




1. A trouble diagnosis apparatus for a plurality of devices controlled by a programmable controller, each of said plurality of devices having an assigned registered number, said apparatus comprising:

(a) a mode setting means for selectively setting an operation mode to one of an instruction mode and a diagnosis mode;

(b) an instruction operation control means, operative when said instruction mode is set, for causing the programmable controller to control a designated one of said controlled devices, for checking a change in an output data pattern of the controller, and for storing a changed input-output data pattern in storage means in association with a registered number of the designated controlled device whenever the output data pattern of the controller changes; and

(c) a diagnosis operation control means, operating when said diagnosis mode is set, for discriminating whether each input/output data pattern constituting an input/output data pattern series stored together with a registered number in the storage means appears within each predetermined monitoring time period for a designated controlled device having said registered number assigned thereto, for diagnosing that the designated controlled device develops trouble when an input/output data pattern which is same as the stored input/output data pattern does not appear, and for identifying locations at which the input/output data pattern does not match the stored input/output data pattern as fault locations of the designated controlled device.

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**4,942,514**

## PROCESS MONITORING AND CONTROL SYSTEM AND METHOD OF PROCESS MONITORING AND CONTROL

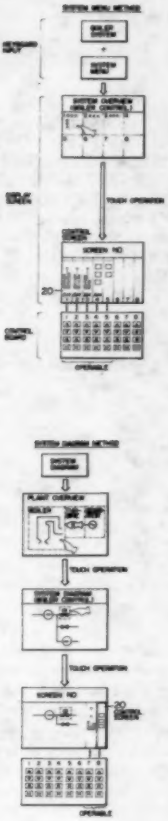
**Hisanori Miyagaki, Hitachiota; Katsuhito Shimizu; Haruya Tobita, both of Hitachi; Atsushi Takita, Mito; Tooru Kimura, Hitachi; Akira Sugano, Katsuta; Masayuki Kikuchi, Hitachiota, and Masayuki Fukai, Hitachi, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 9, 1988, Ser. No. 268,714**

**Claims priority, application Japan, Nov. 17, 1987, 62-288409; Feb. 17, 1988, 63-32770**

**Int. Cl.[5] G06F *3/14***

**U.S. Cl. 364—190** **43 Claims**



1. A process monitoring and control system comprising:

means for displaying a system diagram including diagrams of process control devices on a display screen of a display unit;

input means for providing an instruction upon selection of a particular control device to be controlled;

means for displaying on the display screen, together with at least a diagram of the selected control device, a control screen including at least one of a control data selection area and an operating condition display area corresponding to the particular control device upon an input instruction for selecting the particular control device from the diagrams of the process control devices;

means for indicating to an operator the content of the input

instruction upon provision of the input instruction for selecting control data in the control data selection area on the control screen; and

means for providing an operation start signal to the particular control device selected by the input instruction upon operation of a switch corresponding to the control screen from which control data has been selected and belonging to a group from among groups of switches disposed outside of the display screen, each of the groups uniquely corresponding to a separate control screen.

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**4,942,515**

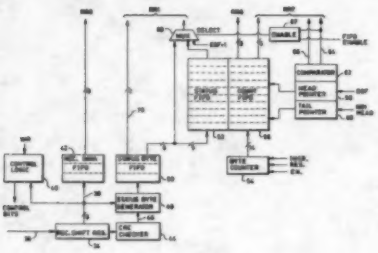
## SERIAL COMMUNICATIONS CONTROLLER WITH FIFO REGISTER FOR STORING SUPPLEMENTAL DATA AND COUNTER FOR COUNTING NUMBER OF WORDS WITHIN EACH TRANSFERRED FRAME

**Teresa Marzacco, Waltham, Mass.; John Korpusik, Hudson, N.H., and Patricia A. Martin, Westford, Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.**

**Filed Mar. 31, 1986, Ser. No. 846,337**

**Int. Cl.[5] G06F *13/28, 12/06, 13/00***

**U.S. Cl. 364—200** **5 Claims**



1. Input/output control circuitry for a data communication system for receiving sequential frames of incoming data words, each frame having an end, and for transferring the data words to memory which is separate from the control circuitry, the control circuitry comprising:

means for generating supplemental data to be read from the control circuitry, supplemental data being information which is different from but is associated with each frame of incoming data;

means for counting the number of words within each frame to provide a word count;

means comprising a first-in/first-out register (FIFO),coupled to the means for generating and the means for counting, for storing the supplemental data and the associated word counts with continued transfer of sequential frames of data to said memory, such that the supplemental data and word counts are available to be read fron. the control circuitry after transfer of the frame with which the supplemental data is associated; and

control logic means responsive to said supplemental data for incrementing the first-in/first-out register at the end of each frame and for decrementing the first-in/first-out register as each set of supplemental data and associated word count is read and processed by a central processing unit.

**4,942,516**

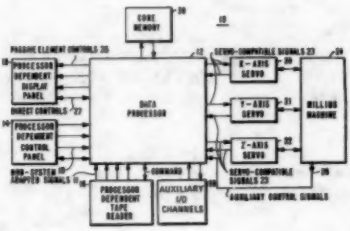
## SINGLE CHIP INTEGRATED CIRCUIT COMPUTER ARCHITECTURE

**Gilbert P. Hyatt, 7841 Jennifer Cir., La Palma, Calif. 90623**

**Continuation-in-part of Ser. No. 223,959, Jan. 12, 1981, abandoned, and a continuation-in-part of Ser. No. 860,253, Dec. 14, 1977, abandoned, and a continuation-in-part of Ser. No. 860,256, Dec. 14, 1977, Pat. No. 4,829,419, and a continuation-in-part of Ser. No. 860,258, Dec. 14, 1977, and a continuation-in-part of Ser. No. 402,520, Oct. 1, 1973, Pat. No. 4,825,364, and a continuation-in-part of Ser. No. 101,881, Dec. 28, 1970, abandoned, and a continuation-in-part of Ser. No. 879,293, Nov. 24, 1969, abandoned. This application Jun. 17, 1988, Ser. No. 209,115**

**Int. Cl.[5] G06F *1/00***

**U.S. Cl. 364—200** **41 Claims**



1. A computer system comprising:

a single chip stored program digital computer implemented on a single integrated circuit chip, said single chip stored program digital computer including

(1) an integrated circuit read only memory storing computer instructions, wherein said integrated circuit read only memory is implemented on said single integrated circuit chip;

(2) an integrated circuit alterable memory storing computer operands, wherein said integrated circuit alterable memory is implemented on said single integrated circuit chip; and

(3) an integrated circuit processing circuit coupled to the integrated circuit alterable memory and processing the computer operands stored by said integrated circuit alterable memory in response to the computer instructions stored by said integrated circuit read only memory, wherein said integrated circuit processing circuit is implemented on said single integrated circuit chip.

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**4,942,517**

## ENHANCED INPUT/OUTPUT ARCHITECTURE FOR TOROIDALLY-CONNECTED DISTRIBUTED-MEMORY PARALLEL COMPUTERS

**Ronald S. Cok, Rochester, N.Y., assignor to Eastman Kodak Company, Rochester, N.Y.**

**Filed Oct. 8, 1987, Ser. No. 105,836**

**Int. Cl.[5] G06F *15/16***

**U.S. Cl. 364—200** **5 Claims**

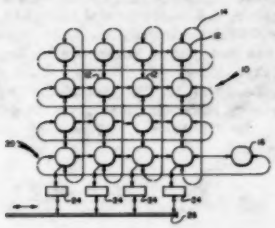
1. In a toroidally-connected distributed-memory parallel computer having rows and columns of processors, wherein each processor has an independent memory and is connected to four neighboring processors, the improvement comprising:

(a) at least one common I/O channel;

(b) a plurality of buffering mechanisms, each being connected to such I/O channel and to only one corresponding processor in a given row of processors; and

each such processor of said given row being connected to only one corresponding buffer mechanism in such a man-

ner that it can access its buffer mechanism independently of the access to such buffer mechanism by the I/O chan-



nel, and independently of access to the buffer mechanisms corresponding to other processors in said given row.

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**4,942,518**

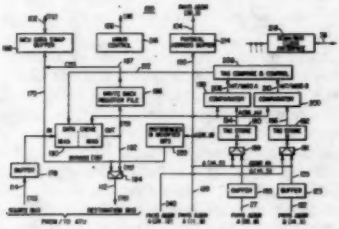
## CACHE STORE BYPASS FOR COMPUTER

**James R. Weatherford, Lake Dallas; Arthur T. Kimmel, and Steven J. Wallach, both of Dallas, all of Tex., assignors to Convex Computer Corporation, Richardson, Tex.**

**Division of Ser. No. 622,562, Jun. 20, 1984. This application Nov. 12, 1985, Ser. No. 796,745**

**Int. Cl.[5] G06F** *12/08, 15/347*

**U.S. Cl. 364—200** **2 Claims**



1. A physical cache unit for a computer having a main memory and central processor and which utilizes both scalar and vector operands, comprising: 'a cache store for storing only said scalar operands therein,

first bus means for transferring operands between said cache store and said main memory,

second bus means for transferring operands between said cache store and said central processor,

bidirectional bus bypass means for transferring operands between said main memory and said central processor by bypassing said cache store,

means responsive to addresses produced by said central processor for reading scalar operands from said cache store and for transferring said scalar operands through said second bus means to said central processor; and responsive to addresses received from said central processor for transferring said scalar operands from said main memory through said first bus means into said cache store when operands having said addresses are not present in said cache store, and

said bidirectional bus bypass means for transferring both said scalar and said vector operands in both directions between said main memory and said central processor for bypassing said cache store when vector operands are requested by said central processor or when scalar operands requested by said central processor are not present in said cache store.

**4,942,519**

## COPROCESSOR HAVING A SLAVE PROCESSOR CAPABLE OF CHECKING ADDRESS MAPPING

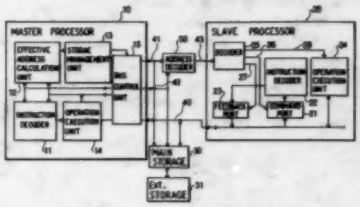
**Takashi Nakayama, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Dec. 29, 1986, Ser. No. 947,244**

**Claims priority, application Japan, Dec. 25, 1985, 60-294285**

**Int. Cl.[5] G06F** *15/16, 13/00*

**U.S. Cl. 364—200** **19 Claims**




1. A control system for a microprocessor device, said microprocessor device comprising:

a first microprocessor, a second microprocessor controlled by said first microprocessor to execute an operation of a portion of instruction sets,

a main storage for storing programs and data for said first microprocessor and said second microprocessor,

an external storage coupled to said main storage for storing programs and data for said first microprocessor and said second microprocessor, and

a bus coupling said first microprocessor, said second microprocessor and said main storage to each other so as to transfer data and instructions to each other, said instructions including instructions for said first microprocessor and instructions for said second microprocessor;

said first microprocessor including a bus control unit for controlling a status of said bus with respect to said second microprocessor, said main storage and said external storage, a first instruction decoder for decoding an instruction for said first microprocessor into a first decoded instruction and a first operation execution unit for executing said first decoded instruction for said first microprocessor with data stored in a memory location indicated by said first decoded instruction for said first microprocessor;

said second microprocessor including a second instruction decoder for decoding an instruction for said second microprocessor into a second decoded instruction for said second microprocessor and a second operation execution unit for executing said second decoded instruction for said second microprocessor with data stored in a memory location indicated by said second decoded instruction; and wherein

all memory locations of said main storage and said external storage being mapped into a virtual memory with a paging method, and instructions being assigned with virtual addresses,

said control system comprising:

feedback means provided in said second microprocessor and including a feedback port responding to a command from said first microprocessor for temporarily holding said second decoded instruction for said second microprocessor including an address required for virtual memory management by said first microprocessor; and

means provided in said first microprocessor for reading a content of said feedback port for detecting whether or not a memory location required by said second decoded instruction for said second microprocessor is physically present in said main storage, said detecting means being coupled with said bus control unit for enabling access to said main storage and generating an input/output bus cycle signal for allowance of instruction execution of

said second microprocessor when said memory location required by said second decoded instruction for said second microprocessor is physically present in said main storage and can be accessed, said detecting means operating to generate an interrupt to transfer programs and data from said external storage to said main storage when said memory location required by said second decoded instruction is physically present in said main storage, and thereafter to generate said input/output bus cycle signal for allowance of instruction execution of said second microprocessor,

said feedback means also including a third decoder receiving said input/output bus cycle signal for allowance of instruction execution of said second microprocessor for generating an internal start signal to said second operation execution unit of said second microprocessor so that said second operation execution unit of said second microprocessor starts its instruction execution only after said start signal is generated.

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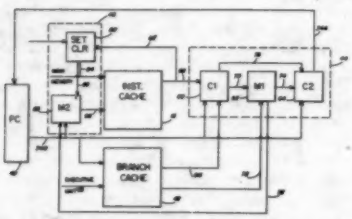
**4,942,520**

**METHOD AND APPARATUS FOR INDEXING, ACCESSING AND UPDATING A MEMORY**

**Brian K. Langendorf, Worcester, Mass., assignor to Prime Computer, Inc., Natick, Mass.**

**Filed Jul. 31, 1987, Ser. No. 80,453**
**Int. Cl.[5] G06F *9/34, 9/355, 9/38***
**U.S. Cl. 364—200** **21 Claims**




3. A cache memory system for a pipelined digital computer, comprising:

instruction cache means having a plurality of instruction cache locations for storing a plurality of instruction cache data entries, each of said instruction cache data entries having an associated coupling bit field, each of said instruction cache locations accessible by a first index,

branch cache set means having a plurality of branch cache locations for storing a plurality of branch cache data entries, a plurality of said branch cache data entries having a corresponding instruction cache data entry, each of said branch cache locations accessible by a second index comprising a portion of the first index of said corresponding instruction cache data entry, said branch cache data entries each including a back pointer field,

means responsive to one of said first indexes for accessing one of said corresponding instruction cache data entries,

means responsive to the second index and backpointer field of said at least one branch cache data entry for reconstructing the first index of said corresponding instruction cache data entry, and

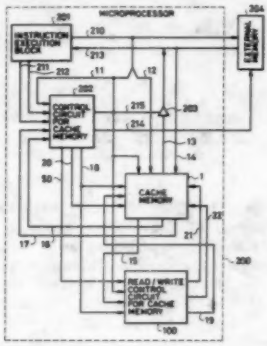
means responsive to said reconstructed first index for accessing the instruction cache location containing said corresponding instruction cache data entry and for initializing said associated coupling bit field,

**4,942,521**

**MICROPROCESSOR WITH A CACHE MEMORY IN WHICH VALIDITY FLAGS FOR FIRST AND SECOND DATA AREAS ARE SIMULTANEOUSLY READABLE**

**Makoto Hanawa, Kokubunji; Atsushi Hasegawa, Koganei, and Tadahiko Nishimukai, Sagamihara, all of Japan, assignors to Hitachi, Ltd. and Hitachi Microcomputer Engineering Ltd., both of Tokyo, Japan**

**Filed Nov. 13, 1987, Ser. No. 119,919**
**Claims priority, application Japan, Nov. 14, 1986, 61-271235**
**Int. Cl.[5] G06F *12/02, 9/30, 13/00***
**U.S. Cl. 364—200** **12 Claims**




1. A microprocessor comprising:

(a) an instruction execution block for executing instructions using data stored in a cache memory or in an external memory;

(b) a cache memory coupled to said instruction execution block and including at least first and second data in areas which are commonly accessed by an upper bit signal of an instruction fetch address generated from said instruction execution block, the respective first and second data areas in said cache memory being selectively specified by a lower bit signal of said instruction fetch address, and wherein each area of said first and second data areas in said cache memory includes data and a flag associated with the data which indicates whether or not said data is valid;

(c) first means for reading out a flag in said second data area when a flag in a commonly accessed first data area is read out in response to said upper bit signal and a lower bit signal of an instruction fetch address which specifies said first data area;

(d) second means coupled to said first means for latching information related to a flag of said second data area when a flag of said second data area is read out by said first means; and

(e) third means for reading out said information from said second means in response to a lower bit signal of said instruction fetch address which specifies said second data area when said second data area is consecutively accessed after said first data area is accessed.

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**4,942,522**

**TIMER CHANNEL WITH MULTIPLE TIMER REFERENCE FEATURES**

**Brian F. Wilkie; Vernon B. Goler, both of Austin; Stanley E. Groves, Round Rock, and John J. Vaglica, Austin, all of Tex., assignors to Motorola, Inc., Schaumburg, Ill.**

**Filed Aug. 19, 1988, Ser. No. 234,103**
**Int. Cl.[5] G06F *1/04***
**U.S. Cl. 364—200** **8 Claims**

1. A timer responsive to at least two timer reference signals comprising:

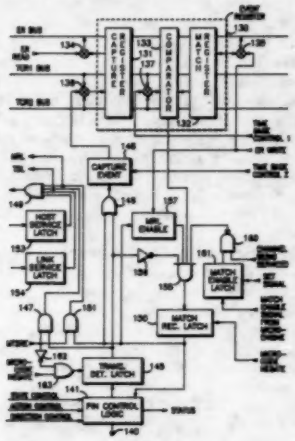
a capture register;

a match register;

first timer reference select means for selecting one of said at least two timer reference signals;

second timer reference select means for selecting one of said at least two timer reference signals;

capture logic means responsive to an input to the timer to load said capture register with a representation of a value of the timer reference signal selected by said first timer reference select means; and



match logic means responsive to the contents of said match register and to the value of the timer reference signal selected by said second timer reference select means to produce a match output if a predetermined relationship exists between the value of the timer reference signal selected by said second timer reference select means and the contents of the match register.

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**4,942,523**

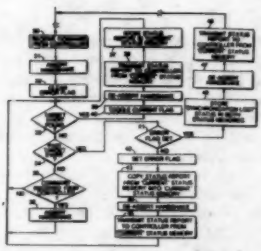
## METHOD FOR RECOVERY FROM SYNCHRONIZATION LOSS IN A QUEUED DATA TRANSFER

**Mark L. Gembarowski, Ft. Collins, Colo., assignor to Hewlett-Packard Company, Palo Alto, Calif.**

**Division of Ser. No. 740,105, May 31, 1985, Pat. No. 4,811,283. This application Nov. 28, 1988, Ser. No. 276,707**

**Int. Cl.[5] G06F *11/00***

**U.S. Cl. 364—200** **3 Claims**



1. A method for facilitating recovery from a loss of synchronization in a queued data transfer involving a multiplicity of data sequential transfer subsets of an overall queued data transfer between a controller and a peripheral device in which successful data transfer subsets are indicated by alternately storing a first status report in first and second memories of the peripheral device that are associated with current and not-current ones of said sequential data transfer subsets, the method facilitating recovery from a loss of synchronization comprising the steps of:

(1) detecting by the peripheral device an occurrence of a target synchronization event associated with a particular data transfer subset transmitted by the controller, a failure by the peripheral device to detect said target synchronization event indicating a loss of synchronization between the controller and the peripheral device;

(2) storing said first status report in both a first status memory and a second status memory of the peripheral device, said first status report indicating successful receipt by the periheral device of a data transfer subset immediately preceding a loss of synchronization detected in step (1);

(3) transmitting said first status report stored in said first and second status memories to the controller, thereby indicating successful receipts by the peripheral device of a data transfer subset immediately preceding the data transfer subset whose target synchronization event was not detected in step (1);

(4) storing a second status report in both the first status memory and the second status memory of the peripheral device, said second status report indicating the loss of synchronization detected in step (1); and

(5) transmitting said second status report stored in said first and second status memories to the controller.

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**4,942,524**

## SOFTWARE TRAP SYSTEM WHICH SAVES PREVIOUS CONTENT OF SOFTWARE TRAP HANDLING POINTER IN A STACK UPON EXECUTION OF A TRAP

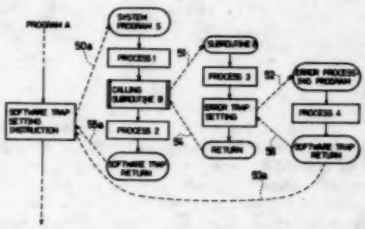
**Yasuhiro Nunomura, Itami, Japan, assignor to Mitsubishi Denki K.K., Tokyo, Japan**

**Filed Jun. 24, 1987, Ser. No. 65,778**

**Claims priority, application Japan, Sep. 3, 1986, 61-208420**

**Int. Cl.[5] G06F *9/00***

**U.S. Cl. 364—200** **4 Claims**



3. A system for processing a software trap, which comprises:

a main memory for storing instructions and having a stack area;

a program counter for holding an address of a next instruction to be fetched from said main memory for execution;

a stack pointer for holding a highest stack location of data stored in multiple layers in said stack area during previous execution of a program;

a software trap handling pointer for continuously holding a stack location of data saved during execution of a previous software trap setting instruction; and

a control unit comprising (a) means for interpreting an instruction fetched from said main memory at an address specified by said program counter and (b) means for controlling not only execution of said instruction but also transmission of data between said software trap handling pointer, program counter, stack pointer, and main memory, said control unit including (a) means for storing, when a software trap is set, information including contents

of said software trap handling pointer and a return address in a stack area between said highest stack location and a next stack location, and (b) means for updating contents of said stack pointer and software trap handling pointer to said next stack location but keeping contents of said software trap handling pointer unchanged at said next stack location until said software trap instruction has been executed or a new software trap is set while contents of said stack pointer are continuously updated to a new highest stack location every time a new subroutine or trap servicing program is called, thereby making not only immediate return to said program possible at the time of a software trap return but also additional error decision in said subroutine unnecessary, thus resulting in the increased program processing efficiency.

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**4,942,525**

## DATA PROCESSOR FOR CONCURRENT EXECUTING OF INSTRUCTIONS BY PLURAL EXECUTION UNITS

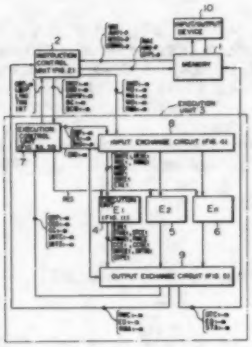
**Yooichi Shintani, Hadano; Kazunori Kuriyama, Saitama; Tohru Shonai; Eiki Kamada, both of Hadano, and Kiyoshi Inoue, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Nov. 20, 1987, Ser. No. 123,139**

**Claims priority, application Japan, Nov. 21, 1986, 61-276554**

**Int. Cl.[5] G06F *9/38***

**U.S. Cl. 364—200** **12 Claims**



1. An information processing apparatus for executing sequentially-ordered instructions, which apparatus requires suppression of the execution of a subset of the sequentially ordered instructions, said subset including those instructions succeeding, in the sequential order, one of the sequentially ordered instructions when a predetermined result for an interrupt is generated as a result of execution of the one instruction, comprising:

a plurality of execution means, each for executing an operation;

storage means, connected to said plurality of execution means for storing result data obtained by said plurality of execution means;

control means, connected to said plurality of execution means, for controlling execution of operations by said plurality of execution means, said control means including,

first means for detecting whether or not a plurality of the instructions satisfy a predetermined condition, for enabling two or more of said plurality of execution means to concurrently start execution of operations required by the plurality of instructions when the plurality of instructions satisfy the predetermined condition, and for writing into said storage means result data generated by said two or more of said plurality of execution means for said plurality of instructions wherein the total number of said plurality of instructions is not larger than a total number of said plurality of execution means;

interrupt means, connected to said plurality of execution means and responsive to a predetermined result for an interrupt generated by one of said two or more of said plurality of execution means executing an operation required by one of the plurality of instructions, for generating an interrupt signal;

said control means further including:

second means, responsive to the interrupt signal generated by said interrupt means, for preventing writing of result data from each of a group of said two more of said plurality of execution means that executes an operation required by an instruction succeeding said one instruction among the plurality of instructions into said storage means;

wherein the predetermined condition includes a first condition based on a first execution time period required for execution of an operation required by each of said plurality of instructions and on a second execution time period required for execution of an operation required by each of instructions preceding to said one said plurality of instructions; and

wherein said first condition is predetermined so that prevention by said second means of writing of a result data for each of instructions succeeding to said one of the plurality of instructions can be done before writing of the result data into said storage by said control means if an interrupt signal is generated in the execution of said one instruction, irrespective of which of the plurality of instructions is said one instruction.

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**4,942,526**

## METHOD AND SYSTEM FOR GENERATING LEXICON OF COOCCURRENCE RELATIONS IN NATURAL LANGUAGE

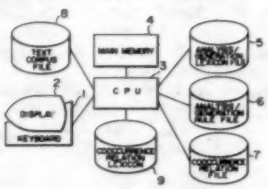
**Atsushi Okajima, Yokohama; Fumiyuki Yamano, Kawasaki, and Eri Katagiri, Yokohama, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan**

**Filed Oct. 24, 1986, Ser. No. 922,889**

**Claims priority, application Japan, Oct. 25, 1985, 60-239779**

**Int. Cl.[5] G06F *15/38***

**U.S. Cl. 364—419** **13 Claims**




1. A method, using a computer including a processor and a memory, of generating cooccurrence relation information indicating whether a sequence of words in a given sentence described in a natural language is semantically correct or not, said method comprising the steps of:

(a) defining categories of sentences on the basis of the types of documents in which the sentences appear;

(b) defining fields of sentences on the basis of the subject matters of the sentences;

(c) preparing a text corpus by collecting input textual sentences belonging to the same category or the same field as the given sentence;

(d) preparing a cooccurrence relation table containing grammar or a set of grammatical rules for analyzing the textual sentences of the text corpus to permit determining a cooccurrence relation between words in the textual sentences;

(e) determining a hypothesized cooccurrence relation between words in the sequence of words in the given sentence on the basis of a cooccurrence relation from said

cooccurrence relation table, the hypothesized cooccurrence relation indicating a particular possible concurrence relation between words in the given sentence;

(f) deriving an actual cooccurrence relation between words in the sequence of words in the given sentence from the determined hypothesized cooccurrence relation;

(g) determining whether the actual cooccurrence relation exceeds a predetermined threshold condition for a valid cooccurrence relation; and

(h) when the actual cooccurrence relation exceeds the predetermined threshold condition, outputting information indicating the actual cooccurrence relation as a valid cooccurrence relation.

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**4,942,527**

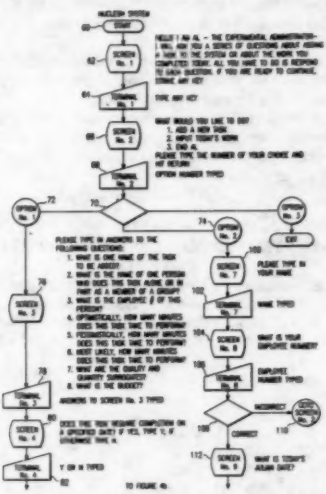
## COMPUTERIZED MANAGEMENT SYSTEM

**Billy G. Schumacher, P.O. Box 2184, Norman, Okla. 73069**

**Filed Dec. 11, 1987, Ser. No. 131,897**

**Int. Cl.[5] G06F *15/21***

**U.S. Cl. 364—401** **8 Claims**



1. A computerized management system comprising:

computing machinery (12–52) for automatically managing an organization, said computing machinery including:

an input/output means (16, 28–34) for communicating management related information from an external source (12) to a computer (18) or from the computer to the external source; and

a computer (18) connected to the input/output means for processing continuously the management related information for the continuous management of the organization;

said computer including a working register (50) for storing information and a control means (36–44) having: first instruction means (60–96) for receiving and processing the management related information received from the external source through an emergence stage for producing an organization task/service management plan for an objective in machine language for the objective for storage;

second instruction means (100–152) for processing the plan through a management convergence stage for generating subdivisional plans for communication through the input-/output means to the external source for reducing the objective to a reality in a controlled manner and for receiving information from the external source relating to objective achievement;

third instruction means (154–168) for processing the management related information including the information generated during the emergence and convergence stages through a proliference stage for generating specifications and quantitative goals for a new version of the objective for processing by the first and second instruction means through the emergence and convegence stages; and

fourth instruction means (170–172) for processing the management related information including information generated during the emergence, convergence, and proliference stages through a divergence stage for producing an organizational policy.

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**4,942,528**

## DIPMETER PROCESSING TECHNIQUE

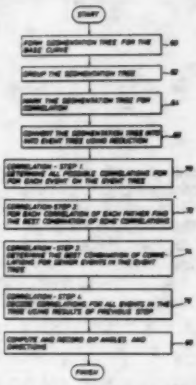
**Mark G. Kerzner, Houston, Tex., assignor to Halliburton Logging Services Inc., Houston, Tex.**

**Continuation-in-part of Ser. No. 63,608, Jun. 18, 1987, Pat. No. 4,853,855. This application Aug. 30, 1988, Ser. No. 238,089**

**The portion of the term of this patent subsequent to Aug. 1, 2006, has been disclaimed.**

**Int. Cl.[5] G01V *1/28***

**U.S. Cl. 364—422** **13 Claims**



1. A method of correlating a pair of dipmeter curves comprising the steps of:

(a) defining a segmentation tree for one of a pair of dipmeter curves;

(b) converting the segmentation tree into an event tree by deleting curve events falling outside an event criteria based on event width and area;

(c) determining correlation coefficients between pairs of curves using said event tree;

(d) optimizing the correlation coefficients between said pairs of curves to obtain optimum curve correlation; and

(e) determining formation dip from the optimally correlated curves.

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**4,942,529**

## LIFT TRUCK CONTROL SYSTEMS

**Isaac Avitan, Vestal; Ralph Allen, Greene; David L. Kellogg, Greene; Stephen L. Page, Greene, and David J. Radley, Whitney Point, all of N.Y., assignors to The Raymond Corporation, New York, N.Y.**

**Filed May 26, 1988, Ser. No. 199,782**

**Int. Cl.[5] G06F *15/20***

**U.S. Cl. 364—424.01** **22 Claims**

1. In a lift truck having a steerable base frame, a mast, a hydraulic lift system operable to move a load carriage along said mast to raise and lower a payload, a traction motor system for driving said truck, and an operator control for generating a speed request signal for requesting variation of the speed of said traction motor system, the combination comprising:

(a) means for deriving a first signal commensurate with the position of said load carriage along said mast;

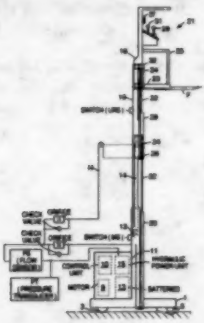
(b) means for deriving a second signal commensurate with the steering angle of said base frame;

(c) means for deriving a third signal commensurate with the weight of the payload on said load carriage; and

(d) means responsive to said first, second, third, and speed request signals for providing a speed limit signal, said speed limit signal being supplied to said traction motor system to limit the speed of said truck.

**18.** A method of generating speed limit values for a lift truck, comprising the steps of:

in a learning mode, storing a first set of data values representing operating parameters of the truck;



in a normal operating mode in which the truck supports a payload, deriving a second set of data values representing operating parameters of the truck, including a data value representing the weight of the payload;

processing the first and the second set of data values to generate an instantaneous truck velocity signal and an instantaneous dynamic speed limit signal, and controlling the speed of said truck in accordance with the value of said instantaneous dynamic speed limit signal.

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**4,942,530**

**CONTROL OF VEHICLE AUTOMATIC TRANSMISSION**

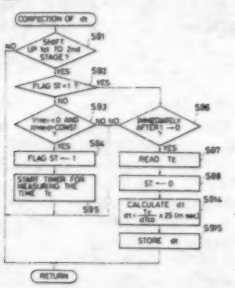
**Keiji Boda, Hiroshima; Kouichirou Waki, Mihara; Kazuo Niide, Hiroshima; Hiroaki Yokota, Higashi-Hiroshima; Keizo Yanagisawa, Fuji, and Hokuto Takeuchi, Fujinomiya, all of Japan, assignors to Mazda Motor Corporation, Hiroshima and Japan Automatic Transmission Co., Ltd., Fuji, both of, Japan**

**Filed Mar. 1, 1988, Ser. No. 162,642**

**Claims priority, application Japan, Mar. 2, 1987, 62-45323; Jun. 12, 1987, 62-146294**

**Int. Cl.[5] B60K** *41/18, 41/16;* **G05D** *17/02*

**U.S. Cl. 364—424.1** **19 Claims**



**19.** An automatic transmission including

a transmission gear mechanism having input means for introducing power from an engine and a plurality of gear stages of different gear ratios,

first and second friction means for selecting one of said gear stages,

first and second actuating means respectively for actuating said first and second friction means,

a hydraulic circuit for controlling a supply of hydraulic pressure to said first and second actuating means,

control means for controlling the hydraulic circuit to supply the hydraulic pressure to said first and second actuating means for establishing a first condition in which said first means for establishing a first condition in which said first friction means is engaged and said second friction means is disengaged to select a first one of said gear stages and to release the hydraulic pressure from said first and second actuating means for establishing a second condition in which said first friction means is disengaged and said second friction means is engaged to select a second one of said gear stages which is lower than said first gear stage,

pressure release rate adjusting means for adjusting a rate of releasing the hydraulic pressure from said second actuating means,

said control means being means for controlling said pressure release rate adjusting means in a shifting down operation from said first one of the gear stages to said second one of the gear stages so that the pressure release from said second actuating means is made at a faster rate for a predetermined time period in an initial period than in a remainder period,

shift condition detecting means for detecting a shift condition from said first stage to said second stage based on a rotation speed of said input means,

compensation means responsive to said shift condition detected by the shift condition detecting means for modifying said predetermined time period for a next gear shifting operation.

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**4,942,531**

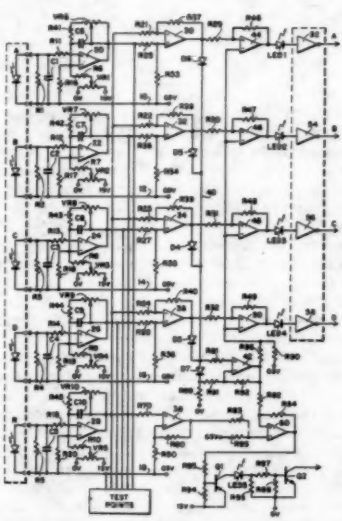
**SELF-ADAPTING SIGNAL DETECTOR WITH DIGITAL OUTPUTS**

**Thomas E. Hainsworth, Holland; F. Nicholaas Spanhak, Jennison, and Richard R. Paske, Jr., Holland, all of Mich., assignors to Bell & Howell Company, Skokie, Ill.**

**Filed May 16, 1988, Ser. No. 194,337**

**Int. Cl.[5] G06F** *15/50*

**U.S. Cl. 364—424.2** **17 Claims**



**1.** A system for an automatically guided vehicle for detecting the presence of a fluorescent material defining a guidepath comprising:

means for providing a first signal representative of said fluorescent guidepath including one or more optical sen-

sors disposed on said vehicle, wherein not all of said sensors are located over said guidepath and an ultraviolet light for irradiating the fluorescent material causing it to emit visible light;

means for detecting background noise;

means responsive to said first signal providing means and said background noise detecting means for providing a signal according to a predetermined criteria indicative of a valid guidepath; and

means responsive to said plurality of optical sensors and said background noise detecting means for providing a signal representative of the maximum value of the differences between each of the optical sensor signals and the background noise signal to define a maximum remainder signal.

15. A method for detecting a guidepath having a detectable characteristic for an automatically guided vehicle comprising the steps of:

detecting first signals representative of said detectable characteristic with a plurality of sensors;

detecting signals representative of background noise;

subtracting the background noise signal from each of said first signals and selecting the maximum difference signal to define a maximum remainder signal;

selecting the lesser of a predetermined percentage of the maximum remainder signal and a predetermined percentage of the background noise signal to define a reference signal; and

providing a valid guidepath signal for each first signal level that exceeds the reference signal.

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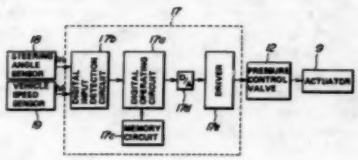
## 4,942,532
## SYSTEM FOR CONTROLLING THE STEERING ANGLE OF THE REAR WHEELS OF A FOUR-WHEEL-STEERABLE MOTOR VEHICLE

**Kazunori Mori, Ebina, Japan, assignor to Nissan Motor Co., Ltd., Japan**

**Filed May 17, 1988, Ser. No. 195,078**
**Claims priority, application Japan, May 20, 1987, 62-121015**
**Int. Cl.[5] B62D 7/14**
**U.S. Cl. 364—424.05** **4 Claims**




1. A system for controlling the steering angle of the rear wheels of a four-wheel-steerable motor vehicle comprising:

rear-wheel steering means for steering the rear wheels of the vehicle;

first calculating means for calculating the Laplace transform $\delta f(s)$ of the front wheel steering angle of the front wheels of the vehicle;

second calculating means for calculating the Laplace transform $\delta r(s)$ of the rear heel steering angle of the rear wheels of the vehicle;

third calculating means for calculating a value G according to the equation

$$G=[(BS^2+CS+D)/(AS+1)]$$
$$?(Bs^2+Cs+D)/(As+1)$$

wherein:

A is a function A(V) of the vehicle speed V,

B is a function $B(V,\phi_0)$ of the vehicle speed V and the normal yaw rate gain $\phi_0$,

C is a function $C(V,\phi_0)$ of the vehicle speed V and the normal yaw rate gain $\phi_0$,

D is a function $D(V,\phi_0)$ of the vehicle speed V and the normal yaw rate gain $\phi_0$, and

s is the Laplace transform variable; and

control means for controlling the rear-wheel steering means so that the relationship between the front wheel steering angle and the rear wheel steering angle satisfies the equation

$$\delta r(s)/\delta f(s)=G.$$

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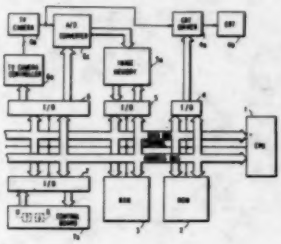
## 4,942,533
## MOBILE RANGE FINDER

**Toshiaki Kakinami, Kawasaki, and Shigemitsu Hamajima, Obu, both of Japan, assignors to Aisin Seiki Kabushiki Kaisha, Aichi, Japan**

**Filed Jul. 7, 1988, Ser. No. 217,261**
**Claims priority, application Japan, Jul. 9, 1987, 62-171678**
**Int. Cl.[5] G06K 9/46; G01C 3/00**
**U.S. Cl. 364—449** **10 Claims**



1. A mobile range finder for use on a first vehicle to detect the distance to a second vehicle at a desired position in a monitoring direction irrespective of the moving state of the first vehicle comprising:

optical picture information generator means installed at a predetermined position on said first vehicle to provide an image of at least a part of a scene in said monitoring direction and generate corresponding picture information on an image plane;

edge extracting means for extracting a region where the picture information generated by said optical picture information generating means shows a distinct change;

component extracting means for extracting a distinct component comprised of lane marking lines on a road in each region extracted by said edge extracting means;

vanishing point determining means including selecting means for selecting from the lines extracted by said component extracting means at least one line included in a preset positive slope region and at least one line included in a preset negative slope region and means for calculating spatial information concerning said vanishing point from a theoretical point or intersection of respective line extensions of said lines and the location of an image of said vanishing point on said image plane;

inclination angle detecting means for determining an angle of elevation between the optical axis of said optical picture information generating means and a reference line extending towards said vanishing point on the basis of the spatial information concerning said vanishing point and the location of said image of said vanishing point on said image plane;

designating means for designating a desired position in said scene in which said second vehicle would first appear;

designated spatial information generating means for generat-

ing spatial information corresponding to the desired position designated by said designating means; and

distance detecting means for detecting the distance from the first vehicle to the position designated by said designating means to determine the distance from said first vehicle to said second vehicle in said desired position on the basis of said spatial information generated by said designated spatial information generating means, information concerning the level of the position at which said optical picture information generating means is installed and said inclination angle information determined by said inclination angle detecting means.

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**4,942,534**

**SIGNAL-TRANSMISSION TYPE PRODUCTION SUPERVISING SYSTEM INCLUDING IC CARD AND WIRELESS TYPE INTERFACE UNIT**

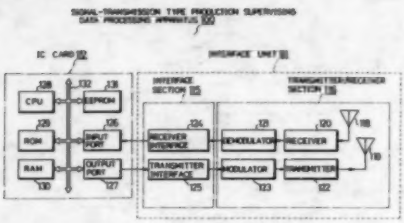
**Masaharu Yokoyama, Sagamigara; Koichi Ogino, Tokyo, and Hidetaka Suzuki, Yokogama, all of Japan, assignors to Nissan Motor Company, Limited, Yokohama, Japan**

**Filed Dec. 2, 1988, Ser. No. 278,838**

**Claims priority, application Japan, Dec. 8, 1987, 62-308776**

**Int. Cl.[5] G06F *13/11*; B62D *63/02***

**U.S. Cl. 364—468** **12 Claims**




1. A data processing apparatus comprising:

an IC (integrated circuit) card including a central processing unit, a first memory unit for storing program data for operating said central processing unit; a second memory unit for storing production supervising data, a third memory unit capable of storing data other than said production supervising data, and said other data being transferred from an external data controlling apparatus; and,

interface means detachably coupled to said IC card for receiving at least an instruction signal transmitted from said external data controlling apparatus to convert said instruction signal into a production supervising data read signal, whereby said production supervising data read signal is processed by the central processing unit so as to read said production supervising data from said second memory unit, and for transmitting said production supervising data read from said second memory unit via said interface means to said external data controlling apparatus, while said IC card is electrically connected to said interface means.

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**4,942,535**

**COLLATION RECORD GENERATION AND CONTROL**

**Robert Francisco, New Fairfield, Conn., assignor to Pitney Bowes Inc., Stamford, Conn.**

**Filed Dec. 30, 1988, Ser. No. 292,616**

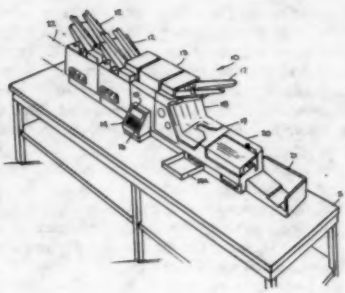
**Int. Cl.[5] G06F *15/00***

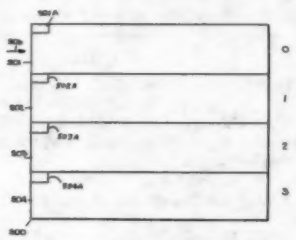
**U.S. Cl. 364—478** **9 Claims**

1. In a material processing system comprising a plurality of material processing stations, and means for transporting articles to be processed serially through said processing stations in a given order;

the improvement wherein each of said processing stations comprises a data and control processing system, and further comprising a communication path interconnecting each said data and control processing system with the data and control processing system of the next preceding and next succeeding material processing station in said given order;

each said data and control processing system comprising means for controlling material processing at each respective station, means for signaling the data and control processing system of the next previous station that the respective station is ready to receive material to be processed therefrom, and means for directing data to the data control and processing system of the next succeeding station concerning material processing steps that have been taken in the respective station on material to be received from the data and control processing system of the next previous station concerning material processing steps that had previously been taken on said material to be passed to the next succeeding station.



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**4,942,536**

**METHOD OF AUTOMATIC CIRCUIT TRANSLATION**

**Toshinori Watanabe, Sagamihara; Fumihiko Mori, Yokohama; Tamotsu Nishiyama, Inagi; Makoto Furihata, Sawa; Yasuo Kominami, and Noboru Horie, both of Takasaki, all of Japan, assignors to Hitachi, Ltd. and Hitachi Microcomputer Engineering Ltd., both of Tokyo, Japan**

**Filed Apr. 21, 1986, Ser. No. 854,032**

**Claims priority, application Japan, Apr. 19, 1985, 60-82400**

**Int. Cl.[5] G06F *15/60***

**U.S. Cl. 364—490** **17 Claims**

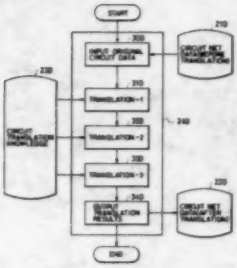
1. An automatic circuit translation method for translating first circuit net data representing a first circuit into second circuit net data representing a second circuit realizing the same function as that of a first circuit represented by said first circuit net data in a system having a processor means for processing data and a memory means for storing translation rules of circuit element representations each of which is determined depending upon connective relations of each circuit element with at least one circuit element and upon the function of each circuit element, wherein each of said translation rules is de-

scribed by a predicate logic program, and wherein each of said first and second circuit net data is described by a predicate logic program, said method comprising the steps of:

inputting said first circuit net data to said processor means;

extracting, by said processor means, the connective relations between circuit elements in the first circuit from the inputted first circuit net data;

selecting a translation rule on the basis of the extracted connective relations;



translating, by said processor means, the circuit elements of the first circuit represented by said inputted first circuit net data to those of the second circuit represented by the second circuit net data based on a selected translation rule; and

outputting said second circuit net data as results of the translation from said processor means.

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**4,942,537**

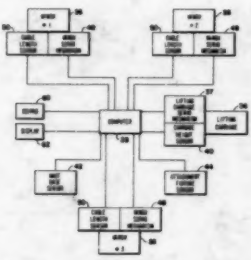
**SYSTEM FOR ASSEMBLING AND DISASSEMBLING A MAST**

**Edward H. Verry, Old Orchard Beach, Me., assignor to Fiber Materials, Inc., Biddeford, Me.**

**Filed Dec. 15, 1988, Ser. No. 285,051**

**Int. Cl.[5] E04H *12/00*; G06F *15/20***

**U.S. Cl. 364—512** **10 Claims**



9. Apparatus for assembling or disassembling a plurality of elongate mast sections adapted to be attached together end-to-end so as to form a unitary mast, said apparatus comprising:

a frame comprising a reference surface;

a lifting carriage attached to said frame and couplable with at least one of said sections of said mast, said lifting carriage being adapted to move said mast up and down along a vertical path;

a plurality of guy lines each having first and second ends, said first ends being attached to said mast at a selected position thereon;

a plurality of winch assemblies each adapted to be anchored to a surface, each of said plurality of winch assemblies comprising a rotatable winch operable in either a forward or a reverse direction for feeding out or reeling in, respectively, a corresponding respective one of said plurality of guy lines, and a motor for causing said winch to rotate in either said forward direction or said reverse direction upon receipt of a control signal, wherein the direction in which each of said motors causes said corresponding respective one of said plurality of winches to rotate and the length of time said each of said motors causes said corresponding respective one of said plurality of winches to rotate in said forward direction or said reverse direction is based upon information contained in said control signal;

a first length sensor coupled to said lifting carriage and designed to provide a first output signal (1) which is representative of the height said lifting carriage is positioned above said reference surface and (2) which varies continuously as said lifting carriage moves along said vertical path;

a plurality of second length sensors each coupled to a corresponding respective one of said plurality of winch assemblies, each of said plurality of second length sensors being designed to provide a second output signal which is representative of the length of said corresponding respective one of said plurality of guy lines which has been unreeled from the one of said plurality of winch assemblies to which said each plurality of second length sensors is coupled; and

a computer coupled to each of said motors of said plurality of winch assemblies, to said first length sensor, and to said plurality of second length sensors, for generating a unique one of said control signals for each of said motors based on information contained in said first output signal, said second output signals, the distance each of said winch assemblies is spaced horizontally and vertically from the surface on which said lifting carriage rests, the distance said reference is positioned above said surface on which said lifting carriage rests, and trigonometric formulae, said control signals being generated to contain information which when received by said motors will cause said motors to operate in either said forward or reverse directions and for periods of time so that the lengths of said plurality of guy lines unreeled from said plurality of winches are such that said plurality of guy lines acting together support said mast in a vertical position.

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**4,942,538**

**TELEROBOTIC TRACKER**

**Joseph S. Yuan, Toronto; Richard A. MacDonald, West Hill, and Felix H. N. Keung, Willowdale, all of Canada, assignors to Spar Aerospace Limited, Mississauga, Canada**

**Continuation of Ser. No. 232,546, Aug. 15, 1988, abandoned, which is a continuation of Ser. No. 927,875, Nov. 7, 1986, abandoned. This application Feb. 23, 1989, Ser. No. 315,260**

**Int. Cl.[5] G06F *15/00***

**U.S. Cl. 364—513** **10 Claims**

1. A telerobotic system adapted for handling a moving objects, said object having at least three points of known position, comprising:

(a) a robot manipulator comprising

(i) a movable robotic arm having an effector for handling an object,

(ii) means for moving said arm in response to arm input signals,

(iii) means for sensing the position of said arm and for generating arm output signals, which arm output signals characterize the dynamic motion behaviour of said arm, and

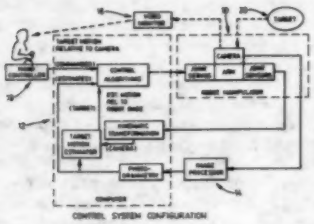
(iv) a video camera carried by said arm, said camera being adapted to respond in real time to real time motion of said moving object within the field of view of said camera;

(b) a video monitor for receiving an input video signal from

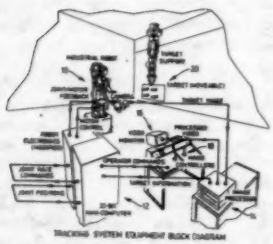
said video camera and for displaying an image of the object to a human operator;

(c) image processing means, responsive to the output signal of said camera, for acquiring and pre-processing an image of the object on a frame by frame basis;

(d) hand control means for generating a hand control output signal in response to input from a human operator;



CONTROL SYSTEM CONFIGURATION



TRACKING SYSTEM EQUIPMENT BLOCK DIAGRAM

(e) computer means for generating arm input signals disposed between said hand control means, said robot manipulator, and said image processing means, said computer means receiving (i) output signals from said image processing means and (ii) said arm output signals and (iii) said hand control output signal and generating arm input signals in response to said received signals whereby said arm tracks the real time motion of the object.

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**4,942,539**

## METHOD AND SYSTEM FOR AUTOMATICALLY DETERMINING THE POSITION AND ORIENTATION OF AN OBJECT IN 3-D SPACE

**H. Dean McGee, Rochester Hills; Kenneth W. Krause, Rochester, and Bruce E. Coldren, Troy, all of Mich., assignors to GMF Robotics Corporation, Auburn Hills, Mich.**

**Filed Dec. 21, 1988, Ser. No. 287,885**
**Int. Cl.[5] G01B *11/00***
**U.S. Cl. 364—513** **41 Claims**

1. Method for automatically determining the position and orientation of an object in 3-D space from as few as one digital image generated by as few as one 2-D sensor, the method comprising the steps of:

generating sensor calibration data relating the position and orientation of the 2-D sensor to the 3-D space;

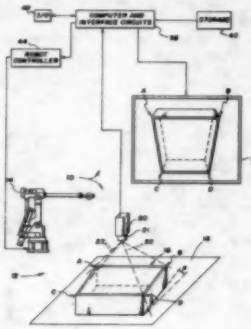
generating reference data relating to at least three non-collinear geometric features of an ideal object;

generating the digital image containing the at least three-non-collinear geometric features of the object wherein at least two of the features reside in the image generated by the one 2-D sensor;

locating each of the features in the digital image;

computing at least three non-parallel 3-D lines as a function of the feature locations and the sensor calibration data, each of the 3-D lines passing through its respective feature of the object at a reference point;

determining a starting point on each of the 3-D lines in the vicinity of its associated reference point;



determining the actual 3-D location of each feature on its associated 3-D line utilizing the reference data and its respective starting point on the 3-D line; and

utilizing the reference data and the actual 3-D location of each of the features to determine the position and orientation of the object.

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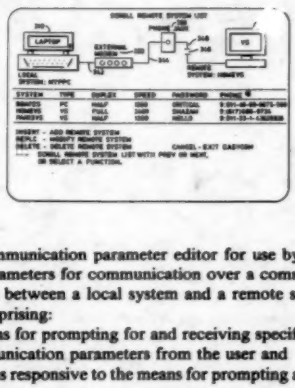
**4,942,540**

## METHOD AN APPARATUS FOR SPECIFICATION OF COMMUNICATION PARAMETERS

**Darryl P. Black, Merrimack, N.H., and Elizabeth G. Ricci, Bedford, Mass., assignors to Wang Laboratories, Inc., Lowell, Mass.**

**Filed Mar. 2, 1987, Ser. No. 20,838**
**Int. Cl.[5] G06F *3/04***
**U.S. Cl. 364—514** **13 Claims**



1. A communication parameter editor for use by a user to specify parameters for communication over a communication connection between a local system and a remote system, the editor comprising:

(A) means for prompting for and receiving specifications of communication parameters from the user and

(B) means responsive to the means for prompting and receiving for

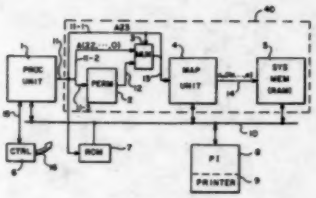
(1) displaying, during the prompting for communication parameters, a depiction of the local system, the remote system, and the communication connection therebetween that indicates the value of at least on communication parameter, and

(2) updating said depiction when the value of said one communication parameter changes.

## 4,942,541
## PATCHIFICATION SYSTEM

Jeffrey H. Hoel, Los Altos; Eduardo D. Martinez, Mountain View, and Jacobo Valdes, Palo Alto, all of Calif., assignors to Oms, Inc., Mobile, Ala.

Filed Jan. 22, 1988, Ser. No. 147,260
Int. Cl.[5] G06F *3/12*
U.S. Cl. 364—519 12 Claims




1. A page printer processing system for receiving encoded layout data and painting a bit-mapped image stored in read/-write physical memory in which each pixel can be independently painted and for shipping out the bit-mapped image to the printer to print a page, including decoding means for receiving the page layout data and converting it to bit-mapped image data, said physical memory storing data, including the bit-mapped page memory data, at random access physical addresses,

means for assigning bit-mapped image data to logical addresses in logical memory, said logical memory divided into logical memory patches,

means for mapping the addresses of logical memory patches to the addresses of physical memory patches so constructed and arranged that at least some logical patches containing identical bit-mapped data are mapped to at least one common patch in physical memory, said mapping means comprising a permuter means for transforming non-contiguous logical addresses to contiguous logical addresses within logical patches, and said mapping means making patches in physical memory other than said at least one common patch available for reuse as soon as the portion of the bit-mapped image stored therein has been shipped out and no further reference to that data is required by placing the addresses thereof upon a stack, and

means for shipping out the bit-mapped image comprising means for supplying sequential logical addresses of logical patches to said mapping means and wherein said mapping means converts the logical addresses to real addresses of patches in physical memory.

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## 4,942,542
## IMAGE PROCESSING COMPUTER SYSTEM OPTIMIZED TO REDUCE IDLE TIME OF COMPUTER

Shinji Yamakawa, Kyoto, Japan, assignor to Dainippon Screen Mfg. Co., Ltd., Japan

Filed Oct. 11, 1988, Ser. No. 256,051
Int. Cl.[5] G06F *13/00*
U.S. Cl. 364—523 3 Claims

1. An image processing computer system, comprising:

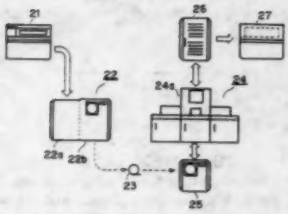
an image reading unit for scanning an original to read image data of the original;

a first storage unit of the type which stores data on removable storage medium, connected on-line to said image reading unit, for writing said image data read by said image reading unit onto said removable storage medium;

a second storage unit of the type which stores data on removable storage medium, for loading thereon removable storage medium on which image data has been written by said first storage unit;

a third storage unit having a fixed storage medium for transferring thereto said image data from said second storage unit;

an image editing unit, connected on-line to said second storage unit and said third storage unit, for fetching and editing said image data transferred to said third storage unit and for generating edited image data; and




an image recording unit for scanning a photosensitive material to record an image on the photosensitive material in accordance with said edited image data generated by said image editing unit;

said image recording unit being connected on-line to said third storage unit, to receive said edited image data through said third storage unit.

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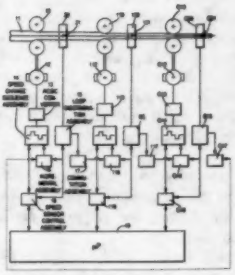
## 4,942,543
## METHOD FOR REGULATING THE PULL IN CONTINUOUS ROLLING TRAINS AND ROLLING TRAIN WHICH ADOPTS SAID METHOD

Luciano Da Rio, Artegna, and Giovanni Bini, Moimacco, both of Italy, assignors to Danieli & C. Officine Meccaniche SpA and CEDA SpA Costruzioni Elettromeccaniche e Dispositivi d'Automazione, Buttrio, Italy

Filed May 13, 1988, Ser. No. 193,528
Claims priority, application Italy, May 15, 1987, 83372 A/87
Int. Cl.[5] G06F *15/46*; B21B *37/06*
U.S. Cl. 364—550 18 Claims



13. Rolling train for carrying out a method to regulate the pull in continuous rolling trains,

said method having each stand set in rotation at the desired speed by its own motor so as to produce rolling conditions such as to be able to roll a bar in conditions almost free of pull, whereby a speed variation cycle is carried out, wherein the value of a reference speed is measured and varied to obtain formation of a microloop in the segment of the rolled product located between the stands, this variation of the value being associated with the monitoring of the microloop, and whereby the reference speed of the motor of the corresponding stand is varied for a specified time and this variation of the reference speed, when

applied to the stand upstream of the zone of formation of the microloop, takes place with an increase of the reference speed followed by a successive return to the original reference speed and with a successive reduction of the speed followed by a final return to the reference speed or to the re-aligned speed

wherein said rolling train comprises for each stand an assembly to sequence a change of speed connected to a speed cascade control assembly and to an incremental assembly.

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4,942,544

## MEDICATION CLOCK

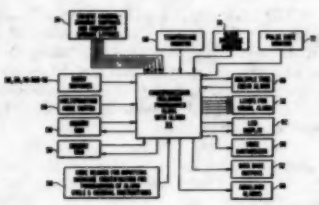
**Kenneth B. McIntosh, Rte. #1, Box 479, Rockvale, Tenn. 37153; James O. Pratt, Murfreesboro, Tenn., and Donald E. Stout, Annandale, Va., assignors to Kenneth B. McIntosh, Rockvale, Tenn.**

**Continuation of Ser. No. 45,047, May 1, 1987, Pat. No. 4,831,562, which is a continuation of Ser. No. 702,746, Feb. 19, 1985, Pat. No. 4,682,299. This application Apr. 14, 1989, Ser. No. 338,104**

**The portion of the term of this patent subsequent to Jul. 21, 2004, has been disclaimed.**

Int. Cl.[5] G08B *1/00*; G06G *15/20*

U.S. Cl. 364—569 15 Claims



1. A medication clock comprising:

(a) a plurality of compartments with each compartment being separately usable for holding one or more medications to be taken by a person either in response to an alarm or medications not taken in response to an alarm;

(b) a programmable timing means which produces a medication dispensing signal indicating the time that a person is to take one or more medications to be taken at specific times;

(c) means, responsive to the medication dispensing signal produced by the programmable timing means, to produce an alarm for alerting the person that is time to take a particular medication;

(d) means which are separately activable by the person for producing an acknowledgement signal that any one of the medications stored in one of the compartments has been taken either in response to an alarm or not in response to an alarm;

(e) a memory, coupled to the programmable timing means, for storing an identification of each medication taken and the time and date of taking each dosage of each medication as signalled by the occurrence of an acknowledgement signal by one of the means for producing an acknowledgement signal; and

(f) means, coupled to the memory, for providing an output of the identification of the medication, and time and date of each dosage of medication taken by the person which is stored in memory for each of the medications being taken by the person.

4,942,545

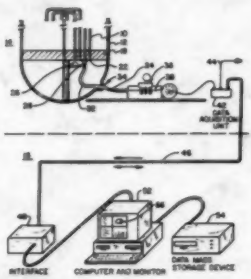
## CALIBRATION OF EDDY CURRENT PROFILOMETRY

**Mark A. Sapia, Canton, Conn., assignor to Combustion Engineering, Inc., Windsor, Conn.**

**Filed Jun. 6, 1988, Ser. No. 202,503**

Int. Cl.[5] G01B *7/00*; G06F *11/00*

U.S. Cl. 364—571.01 6 Claims



1. A method of calibration an eddy current profilometry probe in a system for inspecting a substantially cylindrical field tube, the inspection system including a probe having a plurality n of sensor coils, a step tube standard having nominal and step diameters, a data acquisition subsystem connected to the probe, a data storage subsystem connected to the data acquisition system, and a data analysis subsystem including means for accessing the data in the storage subsystem and means for inferring from the accessed data, the radius of the tube at a plurality of axial locations in the tube, and a user interface for communicating the inferred radii to the user, wherein the method comprises the steps of:

passing the probe through the standard to acquire and record in the data acquisition subsystem and data storage subsystem, respectively, eddy current test (ECT) calibration values for each of the n coils at the nominal and the step diameters of the standard;

passing the probe through the tube to acquire and record in the data acquisition subsystem and the data storage subsystem respectively, ECT inspection values for each of the n coils at each of said axial tube locations;

with the data analysis subsystem, selecting from the data storage subsystem the ECT calibration values acquired from the nominal diameter portion of the standard with each of the n coils and assigning to each of the n coils a first set of paired values consisting of the nominal radius and the ECT calibration value from the nominal diameter portion of the standard;

with the data analysis subsystem, selecting from the data storage subsystem the ECT calibration values acquired from the step diameter portion of the standard with each of the n coils and assigning to each of the n coils a second set of paired values consisting of the step radius and the ECT calibration value from the step diameter portion of the standard;

forming n systems of equations, each system having two equations in two unknowns, each equation defining a quantitative relationship equivalent to

$$X_i = -A_i/(Y_i + B_i) + C$$

where

$X_i$ is the tube radius

$Y_i$ is the probe ECT

$A_i$ is a scaling factor

$B_i$ is an adjacent constant

C is an adjacent constant radius

i is each of the 1 through n coils;

for each of the n system of equations, using said first and second sets of paired radii and ECT calibration values, for the quantities X and Y, respectively, to determine the values of A and B for each of the n coils;

selecting an ECT inspection value from the data storage subsystem for at least one of the n coils and determining a corresponding value of field tube radius using said quantitative relationship including said determined values of A and B for said selected coil; and

communicating the determined value of the field tube radius to said user interface.

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**4,942,546**

## SYSTEM FOR THE SUPPRESSION OF NOISE AND ITS VARIATIONS FOR THE DETECTION OF A PURE SIGNAL IN A MEASURED NOISY DISCRETE SIGNAL

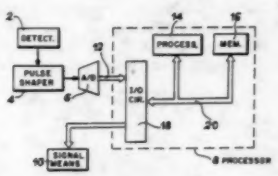
**Michel Rambaut, Bures-sur-Yvette, France, assignor to Commissariat a l'Energie Atomique, Paris, France**

**Filed Sep. 19, 1988, Ser. No. 246,415**

**Claims priority, application France, Sep. 18, 1987, 87 12970**

**Int. Cl.[5] H04B *15/00*; G06F *15/20***

**U.S. Cl. 364—574** **11 Claims**




1. A system for detecting presence of a pure signal in a measured discrete noisy signal comprising in series connection a detector for converting radiation received into electrical pulses, shaping means for shaping the electrical pulses, an analog-to-digital converter, processing means and signalling means, said processing means including a processor, memory means and an input-output circuit connected to exchange data with the processor and memory means, said processor comprising:

means for measuring a pulse counting rate $N_2$ having a means noise level $M_3$ for a first time period $\Delta T_S$;

means for measuring a pulse counting rate $N_3$ having a means noise level $M_2$ for a second time period $\Delta T_b = q\Delta T_S$, where q is a positive real number during which said pure signal is not expected to occur;

means for calculating a false detection probability PF as a function of q and said counting rates $N_2$ and $N_3$;

means for calculating a false detection level TF as a function of said $M_2$, $M_3$ and q;

means for calculating an information I as a function of said false detection probability PF;

means for calculating an information threshold $I_m$ as a function of said false detection level TF; and

means for comparing said information I with said information threshold $I_m$ to thereby determine that a pure signal has been detected in said measured signal, said processing means thereupon controlling said signalling means accordingly.

**4,942,547**

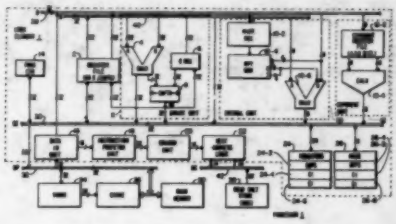
## MULTIPROCESSORS ON A SINGLE SEMICONDUCTOR CHIP

**Thomas F. Joyce, Westford, Mass.; Richard P. Kelly, Nashua, N.H.; Jian-Kuo Shen, Belmont, and Michel M. Raguin, Medford, both of Mass., assignors to Honeywell Bull, Inc., Waltham, Mass.**

**Continuation of Ser. No. 722,237, Apr. 11, 1985, abandoned. This application Dec. 7, 1987, Ser. No. 131,246**

**Int. Cl.[5] G06F *7/38***

**U.S. Cl. 364—748** **8 Claims**



1. A data processing system includes apparatus for performing the functionality of a basic operating system instruction processor, a scientific instruction processor and a commercial instruction processor integrated into a single semiconductor logic chip, said apparatus comprising:

register file means for storing a plurality of operands including floating point operands, binary coded decimal operands and basic operating system operands;

binary unit means coupled to said register file means for processing mantissas of said floating point operands, and binary data of said basic operating system operands;

decimal unit means coupled to said register file means for processing said binary coded decimal operands; and

exponent unit means coupled to said register file means for processing exponents of said floating point operands; and

instruction processing means coupled to said register means, binary unit means, decimal unit means, and exponent unit means, for processing computer instructions for steering operands to be processed which are held in said register file means to the appropriate ones of said units;

wherein a first result of processing said floating point operands, said binary coded decimal operands and said basic operating system operands is stored back in said register file means.

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**4,942,548**

## PARALLEL ADDER HAVING REMOVED DEPENDENCIES

**Stamatis Vassiliadis, Vestal, N.Y., assignor to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jun. 25, 1987, Ser. No. 66,364**

**Int. Cl.[5] G06F *7/50***

**U.S. Cl. 364—784** **48 Claims**

1. A method of high speed data processing through first stage, second stage and third stage logic circuits in a digital computer for adding two operands each having a predetermined length and obtaining a multibit result, the steps comprising:

generating with the first stage of logic circuits based on inputs of selected portions of the two operands a plurality of pseudo signals including pseudo generate, pseudo transmit, pseudo transmit half sum, and pseudo half sum signals;

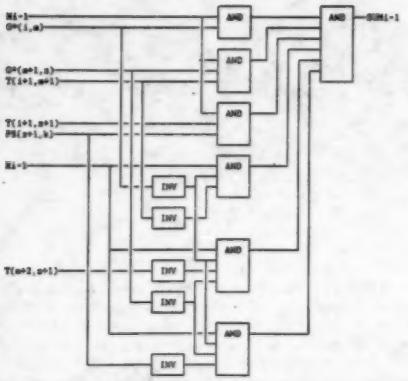
generating with the second stage of logic circuits a plurality of different auxiliary signals produced from said pseudo generate, pseudo transmit, and pseudo half sum signals;

generating with the second stage of logic circuits a new-

carry signal described by a recursive new-carry equation based on said pseudo generate and pseudo transmit signals; and

generating with the third stage of logic circuits a recursive SUM equation as a function of said pseudo signals and said auxiliary signals and said new-carry signal to produce the multibit result for further processing in the computer.

48. In a computer, an improved high speed adder with multiple logic stages for adding two operands each having a predetermined length of 32 bits, including first stage logic circuits, intermediate stage logic circuits receiving certain inputs from said first stage logic circuits, and final stage logic circuits receiving certain inputs from said intermediate stage logic circuits, wherein said first stage, intermediate and final stage logic circuits comprise AND-OR books not greater than a size of 3×8 where 3 refers to the maximum number of inputs for each AND gate and 8 refers to the maximum number of AND gates providing inputs to the OR gate.

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**4,942,549**

**RECURSIVE ADDER FOR CALCULATING THE SUM OF TWO OPERANDS**

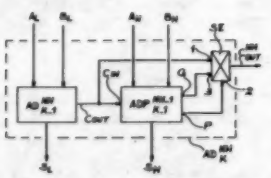
**Francis Jutand, Cachan, and Luc Montperrus, Ville D'Avray, both of France, assignors to Etat Francais represente par le Ministere des Postes, des Telecommunications et de l'Espace (CNET), Issy Les Moulineaux, France**

**Filed Mar. 7, 1989, Ser. No. 320,319**

**Claims priority, application France, Mar. 7, 1988, 88 02867**

**Int. Cl.[5] G06F 7/50**

**U.S. Cl. 364—786** **4 Claims**



1. A recursive type adder for calculating the sum of two operands A and B respectively formed of binary data $a_1$, $a_2$, . . . $a_n$ and $b_1$, $b_2$, . . . , $b_n$ of different weights, operands A and B with a first and a second operand AL and BL respectively formed of the low weight data and a third and fourth operand AH and BH respectively formed of the high weight data, the adder having a recursion level NH, NH being an integer higher than or equal to 1, and an order K, K being an integer defining a number of elementary addition cells in a level 1 adder, being labelled $AD_K^{NH}$, which comprises:

(a) a first recursive adder $AD_{K-1}^{NH}$ of order K−1 and level NH with inputs respectively receiving the first and second low weight operands AL and BL, and a first and a second output respectively furnishing a sum operand SL from the first and second low weight operands AL and BL, and carry output bit COUT, for the additon effected;

(b) a second recursive adder $ADP_{K-1}^{NH-1}$ or order K−1 and level NH−1 with inputs respectively receiving the third and fourth high weight operands AH and BH, an input CIN connected to the second output (COUT) of the first adder and a first, a second and a third output respectively furnishing a sum operand SH from the third and fourth high weight operands AH and BH, a carry propagation bit P corresponding to said sum and a generation bit G from said carry; and

(c) a global carry selector (SE) with three inputs (1, 2, 3) respectively connected to the second output (COUT) of the first adder and to the second and third outputs (G, P) of the second adder, and an output furnishing an outgoing global carry bit $C_{OUT}^{NH}$ resulting from the logic OR operations

$$C_{OUT}=G+P\cdot COUT.$$

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**4,942,550**

**PRINTED CIRCUIT BOARD TOPOGRAPHY FOR HIGH SPEED INTELLIGENT INDUSTRIAL CONTROLLER WITH MULTIPLE BOARDS LOCATED WITHIN A SINGLE SLOT**

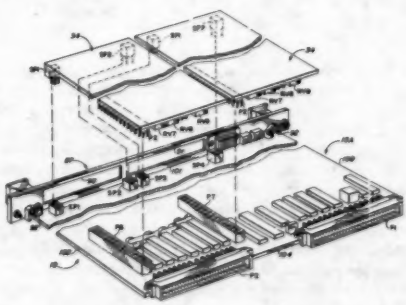
**Kenneth W. Murray, Livingston, Scotland, assignor to Burr-Brown Ltd., Livingston, Scotland**

**Filed Jun. 6, 1988, Ser. No. 202,944**

**Claims priority, application United Kingdom, Jun. 23, 1987, 8714639**

**Int. Cl.[5] G06F 9/02**

**U.S. Cl. 364—900** **14 Claims**



1. An industrial input/output controller for connection to a bus on a back plane, comprising in combination:

(a) a processor board having right, left, upper, and lower edges, including a first connector for plug-in connection to a VMEbus connector on the back plane, a first buffer circuit connected to the first connector, a first address bus and a first data bus each connected to the first buffer circuit, a dual port random access memory connected to the first address bus and the first data bus, a second buffer circuit connected to the first address bus and the first data bus, a second address bus and a second data bus each connected to the second buffer circuit, a microprocessor, a random access memory, read-only memory, an asynchronous communications interface adaptor, a programmable timer module, interrupt handling and generation circuitry, electrical isolation circuitry each connected to

the second address bus and the second data bus, a third address bus and a third data bus each connected to the electrical isolation circuitry, and second and third connectors each connected to both the third address bus and the third data bus;

(b) a first daughter board having right, upper, left, and lower edges including a fourth connector, a fifth connector, and first I/O circuitry connected between the fourth and fifth connectors;

(c) a second daughter board having right, upper, left, and lower edges, including a sixth connector, a seventh connector, and second I/O circuitry connected between the sixth and second connectors;

the first and second daughter boards being attached in close parallel relationship, the fourth connector of the first daughter board being plugged into the second connector of the processor board and the sixth connector of the second daughter board being plugged into the third connector of the processor board both to electrically connect the first and second daughter boards to the third address bus and the third data bus and rigidly attach the first and second daughter boards and the processor board, the fifth and seventh connectors being available for connection of external I/O conductors to the first and second daughter boards, respectively, the first and second daughter boards covering a first area comprising approximately the lower two-thirds of the component side of the processor board, a second area including approximately the upper one-third of the component side of the processor board,

the first connector being located along the right edge of the processor board adjacent to the upper edge thereof, the first buffer circuit being located partly in the second area and partly in the first area adjacent to the first connector, the random access memory, a first portion of the second buffer circuit, and the read-only memory being located in the second area from right to left along the upper edge of the processor board, the microprocessor being located below the first portion or the second buffer circuitry, a second portion of the second buffer circuit being located between the microprocessor and the first buffer circuit below the random access memory,

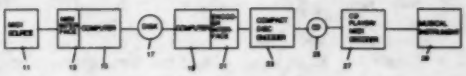
the interrupt handling and generation circuitry being located in the first area adjacent to the first buffer circuit, the second connector being located in the first area along the lower edge of the processor board adjacent to the lower portion of the right edge thereof, a first portion of the isolation control circuitry being located in the first area along the lower portion of the right edge of the processor board above the second connector, the third connector being parallel to the second connector and located in the first area above the first portion of the isolation control circuitry beneath the interrupt handling and generation circuitry and the first buffer, the electrical isolation circuitry being located in the first area to the left of the first portion of the isolation control circuitry between the second and third connectors, a second portion of the isolation control circuitry being located in the first area to the left of the electrical isolation circuitry, the random access memory being located in the first area in the lower left corner of the component side of the processor board to the left of the second portion of the isolation control circuitry whereby only a single slot space for connection to the VME bus is required.

**4,942,551**

## METHOD AND APPARATUS FOR STORING MIDI INFORMATION IN SUBCODE PACKS

**Walter R. Klappert, Topanga, and Alan J. McPherson, Burbank, both of Calif., assignors to WNM Ventures Inc., Burbank, Calif.**

**Filed Jun. 24, 1988, Ser. No. 211,355**
**Int. Cl.[5] G11B *7/00, 20/00*; G06F *3/06***
**U.S. Cl. 364—900** **23 Claims**



1. A system for storing MIDI information in subcode packs for encoding on a compact disc having a main channel and a subcode channel comprising:

(a) a computer having a random access memory, a processor and coupled to a storage device;

(b) MIDI source means for generating MIDI signals;

(c) first interface means coupled to said MIDI source means and said computer for converting the MIDI signals to a form for loading into said memory for access by said processor;

(d) program means for controlling the operation of said processor and said memory so as to convert the MIDI data in said memory to a plurality of subcode packs and writing said subcode packs to a storage medium on said storage device;

(e) second interface means for retrieving said subcode packs on said storage medium and for coupling to a compact disc encoder for converting the MIDI data in the retrieved subcode packs to electric signals useable by the compact disc encoder to encode said MIDI data in the subcode channel on the compact disc.

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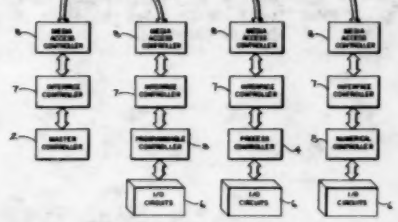
**4,942,552**

## METHOD AND APPARATUS FOR SAVING AND PERFORMING INDUSTRIAL CONTROL COMMANDS

**Richard A. Merrill, Ann Arbor; Bruce L. Crockett, Pinckney, and Robert C. Strader, Saline, all of Mich., assignors to Allen-Bradley Company, Inc., Milwaukee, Wis.**

**Filed Nov. 20, 1986, Ser. No. 932,987**
**Int. Cl.[5] G06F *13/00, 13/14, 9/40***
**U.S. Cl. 364—900** **14 Claims**



1. A method for processing communications command messages in an interface controller which forms part of a network station, the interface controller being connected to a communications network interconnecting a plurality of network stations, and in which each command message is a member of a predetermined set of command messages, the method comprising the steps of:

(a) receiving a first command message in the interface controller from the communications network, the first com-

mand message being a SAVE type remote command message which was originated by one of said plurality of network stations, the first command message including an embedded command and a first ID field comprising a unique identifier corresponding to the embedded command, the embedded command comprising at least a first destination field which identifies one or more of said plurality of network stations and a first operation code which identifies one command message from said predetermined set of command messages, the embedded command being embedded in the format of the first command message;

(b) storing the embedded command in a remote command table which forms a part of said interface controller at a location in the remote command table corresponding to the unique identifier in the first ID field;

(c) repeating steps (a) and (b) to receive and store a plurality of embedded commands in the remote command table, each embedded command being stored in the remote command table at a location corresponding to the unique identifier in the ID field;

(d) receiving a second command message in the interface controller from the communications network, the second command message being a PERFORM type remote command message which was originated from one of said plurality of network stations and the second command message including one or more second ID fields, each second ID field including the unique identifier corresponding to one of said plurality of embedded commands; and

(e) responding to the second command message by the interface controller by (i) retrieving the embedded command corresponding to the unique identifier in one of the second ID fields from the remote command table, (ii) forming a third command message by including a second destination field in the third command message which comprises the first destination field from the retrieved embedded command and by including a second operation code in the third command message which comprises the first command code from the retrieved embedded command, (iii) transmitting the third command message onto the communications network to one or more target network stations as designated by the second destination field, and (iv) performing steps (i) through (iii) for each embedded command corresponding to the unique identifier in each second ID field.

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**4,942,553**

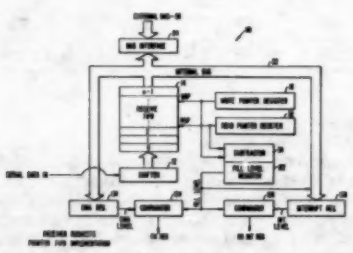
## SYSTEM FOR PROVIDING NOTIFICATION OF IMPENDING FIFO OVERRUNS AND UNDERRUNS

**Monte J. Dalrymple, Fremont, and Lois F. Brubaker, Newark, both of Calif., assignors to Zilog, Inc., Campbell, Calif.**

**Filed May 12, 1988, Ser. No. 192,946**

**Int. Cl.[5] G06F *13/38***

**U.S. Cl. 364—900** **7 Claims**



1. An apparatus for providing notification of impending FIFO overruns and underruns to a direct memory access controller or a co-processor having a predetermined first request level and to a microprocessor having a predetermined second request level, comprising:

means for detecting the fill or empty level of a FIFO and generating an output to indicate the fill or empty level detected;

means for comparing the output of the detecting and generating means to the first request level and for generating a notification to the direct memory access controller or the co-processor when the first request level is exceeded; and

means for comparing the output of the detecting and generating means to the sound request level and for generating a notification to the microprocessor when the second request level is exceeded by the fill or empty level.

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**4,942,554**

## THREE-DIMENSIONAL, ONE-TRANSISTOR CELL ARRANGEMENT FOR DYNAMIC SEMICONDUCTOR MEMORIES COMPRISING TRENCH CAPACITOR AND METHOD FOR MANUFACTURING SAME

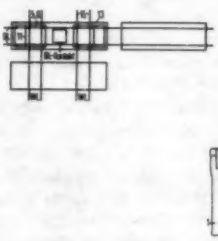
**Roland Kircher, and Josef Goeltzlich, both of Munich, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Berlin and Munich, Fed. Rep. of Germany**

**Filed Oct. 18, 1988, Ser. No. 259,699**

**Claims priority, application Fed. Rep. of Germany, Nov. 26, 1987, 3740171**

**Int. Cl.[5] G11C *11/24*; H01C *29/78***

**U.S. Cl. 365—149** **13 Claims**



1. A three-dimensional, one-transistor cell arrangement for dynamic semiconductor memories, having a field effect transistor and one capacitor for the charges to be stored, the capacitor is created as a trench capacitor in the substrate, the capacitor including a first electrode formed by the substrate and a second electrode that stores the charges is formed by doped polycrystalline silicon that fills up the trench, the field effect transistor resides at the surface of the substrate and has an insulated gate electrode the capacitor separated by an insulating layer is arranged under the field effect transistor a recrystallized silicon layer is applied on the insulating layer and source/drain zones are arranged in the recrystallized silicon layer, the capacitor is connected with the source/drain zones via an electrically conductive contact and:

in an upper portion of the trench, an asymmetrical extension of the trench opening is introduced into the substrate in the upper part of the trench, the asymmetrical extension being filled with polycrystalline silicon having the same doping as in the trench, the electrically conductive contact is established via this filled extension and representing a subregion of the second electrode of the capacitor that stores the charge;

the insulating layer separating the transistor from the capacitor is arranged next to the asymmetrical extension of the trench opening in the trench having the same geometry as the lower portion of the trench; and

the gate electrode of the transistor is arranged over the insulating layer and above the recrystallized silicon layer situated thereover, being arranged thereat such that the source zone generated in the recrystallized silicon layer

overlaps the electrically conductive contact in the asymmetrical extension of the trench opening.

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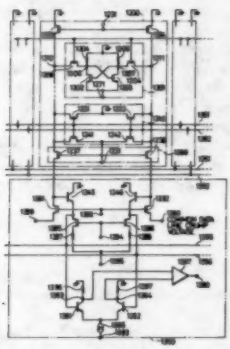
4,942,555

## BI-MOS SEMICONDUCTOR MEMORY HAVING HIGH SOFT ERROR IMMUNITY

Hisayuki Higuchi, Kokubunji; Makoto Suzuki, Hachioji; Noriyuki Homma, Kodaira, and Kiyoo Itoh, Higashikurume, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 38,940, Apr. 16, 1987, Pat. No. 4,866,673. This application Jul. 7, 1989, Ser. No. 376,865
Claims priority, application Japan, Apr. 17, 1986, 61-89012
The portion of the term of this patent subsequent to Sep. 12, 2006, has been disclaimed.
Int. Cl.[5] G11C *7/00, 8/00*
U.S. Cl. 365—189.07 7 Claims



1. A semiconductor memory comprising:

a plurality of pairs of data lines;

a plurality of word lines orthogonally crossing said data lines; and

a detection circuit for detecting memory data from a conduction ratio between a transistor of a flip-flop type memory cell, which is connected to one of said word lines and one pair of said plurality of pairs of data lines, and a load device which is connected to one data line of said one pair of said data lines,

wherein the voltage of said word line for reading out said memory data from said flip-flop type memory cell is set to a voltage lower than the sum of the voltage of said data line and the threshold voltage of a data transfer MOS transistor of said memory cell, and a signal read out from said memory cell through said data line is inputted to a differential amplifier using a base or gate of a junction type transistor as its input, and

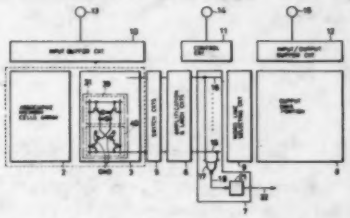
wherein a voltage of said word line for writing data into said flip-flop type memory cell is set to a voltage higher than said voltage of said word line for reading out data from said flip-flop type memory cell.

4,942,556

## SEMICONDUCTOR MEMORY DEVICE

Toshio Sasaki, Tokyo; Masakazu Aoki, Tokorozawa; Masashi Horiguchi, Kokubunji; Yoshinobu Nakagome, Hachioji; Shinichi Ikenaga, Kokubunji, and Toshiaki Masuhara, Tokyo, all of Japan, assignors to Hitachi, Ltd., Tokyo, Japan

Continuation of Ser. No. 41,198, Apr. 22, 1987, abandoned. This application Jul. 10, 1989, Ser. No. 377,181
Claims priority, application Japan, Apr. 23, 1986, 61-92090; May 9, 1986, 61-104640; Jul. 25, 1986, 61-173640
Int. Cl.[5] G11C *13/00*
U.S. Cl. 365—200 30 Claims



1. A semiconductor memory device comprising:

an associative memory including a plurality of associative memory cells divided into individual groups of associative memory cells, each associative memory cell including a memory cell which stores reference data, and a comparator which compares said reference data with an inquiry data and which generates a coincidence detection signal from an output thereof;

a switch circuit including at least first switching means and second switching means for providing controllable transfer of coincidence detection signals therethrough;

wherein respective outputs of the comparators which correspond to one of said groups of associate memory cells of said associative memory are interconnected to a first end of said first switching means, respective outputs of the comparators which correspond to another one of said groups of associative memory cells of said associative memory are interconnected to a first end of said second switching means, and a second end of said first switching means and a second end of said second switching means are interconnected to a coincidence detecting common line;

wherein each of said first and second switching means has a control terminal for controlling the closing and opening of the connections between said first end and said second end, and

wherein said switch circuit further includes control circuit means for controllably opening or closing said first and second switching means and having a first output which is connected to said control terminal of said first switching means and a second output which is connected to said control terminal of said second switching means.

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4,942,557

## MARINE SEISMIC SYSTEM

Aaron J. Seriff, Houston, Tex., assignor to Shell Oil Company, Houston, Tex.

Filed May 18, 1983, Ser. No. 495,854
Int. Cl.[5] G01V *1/38, 1/47*
U.S. Cl. 367—15 11 Claims

1. A method of marine seismic exploration of the earth strata beneath a body of water, said method comprising the steps of:

generating in said body of water downwardly travelling compressional waves and sensing at the interface between

said body of water and earth strata upwardly travelling reflected shear waves that have been converted at said

earth strata from said downwardly travelling compressional waves.

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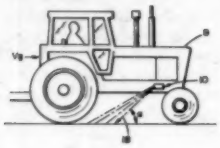
**4,942,558**

## ULTRASONIC VELOCITY SENSOR

**Thomas K. Hiniker, N. Mankato, and Semor D. Tofte, Mankato, both of Minn., assignors to Micro-Trak Systems, Inc., Mankato, Minn.**

**Filed Mar. 31, 1988, Ser. No. 175,777**
**Int. Cl.[5] G01S *15/58***
**U.S. Cl. 367—91** **12 Claims**



1. An ultrasonic velocity sensor comprising:

(a) a transducer for alternatively transmitting an ultrasonic frequency signal and receiving a reflection of the transmitted signal;

(b) clock means for driving the signal transmitted by the tranducer at a predetermined frequency and for providing clock signals to a signal processing means;

(c) amplifier means for processing the reflected signals sensed by the transducer to amplify those signals which are in a predetermined frequency range;

(d) temperature sensing means for sensing the temperature of the medium through which the ultrasonic signal is transmitted and generating an electrical signal indicative of that temperature;

(e) signal processing means for receiving the temperature-indicative signal generated by the temperature sensing means receiving the signal received at the transducer and amplified at the amplifier means, and processing the signals received to generate a signal indicative of the velocity of the transducer relative to the surfaCe which relfects the reflected signal;

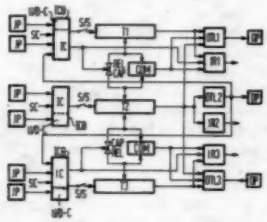
(f) software means for controlling the signal processing means, said software means including means for averaging the readings sampled from the transducer by the signal processing means, means for determining whether successive measurements of the frequency of the received signal indicate a rate of acceleration greater than a predetermined amount and means for limiting the change in the velocity signal output by the sensor if the acceleration exceeds said predetermined amount.

**4,942,559**

## COUNTER/TIMER CIRCUIT FOR A MICROCONTROLLER

**Rod Fleck, Munich, Fed. Rep. of Germany; Mark Poret, Mesa, Ariz.; Karl-Heinz Mattheis, Forstinning, Fed. Rep. of Germany; Javier Magana, Austin, Tex., and Christoph Meinhold, Planegg, Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany and Advanced Micro Devices Inc., Austin, Tex.**

**Filed Jul. 7, 1989, Ser. No. 376,857**
**Claims priority, application Fed. Rep. of Germany, Jul. 8, 1988, 23823235**
**Int. Cl.[5] G04F *8/00*; H03K *21/38***
**U.S. Cl. 368—113** **9 Claims**



1. Counter/timer circuit for a microcontroller, comprising a central register and two auxiliary registers each having transfer outputs and counting inputs, bistable output storage elements each being connected to a respective one of said transfer outputs, interrupt request flags each being connected to a respective one of said transfer outputs, start/stop elements each being connected to a respective one of said counting inputs, input control blocks each being connected to a respective one of said start/stop elements, first reload, capture and compare units connected between one of said auxiliary registers and said central register, and second reload, capture and compare units connected between the other of said auxiliary registers and said central register.

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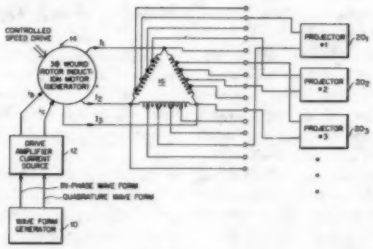
**4,942,560**

## SONAR PROJECTOR ARRAY DRIVE SIGNAL SOURCE

**William P. Harthill, Seattle, Wash., assignor to Honeywell Inc., Minneapolis, Minn.**

**Filed Mar. 13, 1989, Ser. No. 322,265**
**Int. Cl.[5] H04B *1/02***
**U.S. Cl. 367—137** **7 Claims**



1. A sonar projector drive signal source comprising:

waveform generator means for transforming inphase and quadrature excitation to three-phase rotor excitation;

a three-phase generator excited by said waveform generator means and driven at a synchronous frequency corresponding to a center frequency of a desired bandpass signal;

a three-phase delta connected transformer connected to an output of said three-phase generator, said transformer having a plurality of taps; and

a plurality of acoustic projectors connected to respective taps on said transformer.

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**4,942,561**

## DELAY TIME MEASURING DEVICE

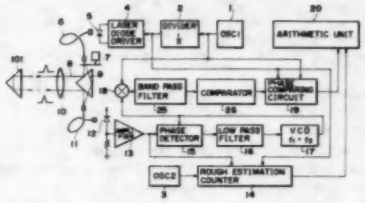
**Masahiro Ohishi, and Fumio Ohtomo, both of Tokyo, Japan, assignors to Kabushikikaisha Topcon, Tokyo, Japan**

**Filed Jun. 28, 1989, Ser. No. 372,630**

**Claims priority, application Japan, Jun. 29, 1988, 63-161894; Dec. 28, 1988, 63-334971**

**Int. Cl.[5] G04F *8/00*; G01C *3/08***

**U.S. Cl. 368—118** **13 Claims**




1. A delay time measuring device comprising:

first reference signal means for supplying a first reference signal having a prescribed frequency;

second reference signal means for supplying a second reference signal synchronized with said first reference signal and having a lower frequency than that of said first reeference signal;

light emission means, coupled to said second reference signal means, for emitting a pulse of light toward a measuring piont in response to said second reference signal;

light reception means for receiving a reflected light signal from the measuring point;

first measuring signal means, coupled to said light reception means, for generating a first measuring signal sychronized with said reflected light signal and having a frequency equal to the frequency of said first reference signal plus the frequency of said second reference signal;

second measuring signal means, coupled to said first refference signal means and said first measuring signal means, for mixing said first reference signal and said first measuring signal and forming a second measuring signal representative of the difference in frequency between said signals; and

phase difference detection means, coupled to said second reference signal means and said second measuring signal means, for developing a precision time delay representative signal based on the phase difference between said second reference signal and said second measuring signal.

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**4,942,562**

## PICKUP ACTUATOR FOR DISK-TYPE MEDIA

**Jun Suzuki, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Mar. 21, 1988, Ser. No. 171,073**

**Claims priority, application Japan, Apr. 15, 1987, 62-93907**

**Int. Cl.[5] G11B *07/12, 03/10, 21/08***

**U.S. Cl. 369—44.11** **1 Claim**

1. An actuator for an optical pickup unit, comprising:

a first pair of first and second yoke plates having an air gap therebetween;

a second pair of first and second yoke plates having a second gap therebetween;

an air gap defined between said first and second pairs of yoke plates;

each of said first yoke plates including an elongated magnet fixed thereto;

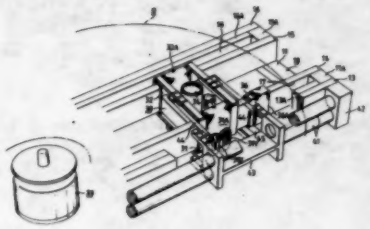
guide means extending in parallel with said first and second pairs of yoke plates;

slider means slidably received on said guide means;

a pickup unit including at least one lens unit;

means for supporting said pickup unit including at least one suspension arm connected at one end to said pickup unit and at a second end to said slider;

said pickup unit further including first and second bobbins disposed surrounding said second yoke plates, respectively, first and second coils wound about said first and second bobbins, for controlling positioning of said pickup unit in a tracking direction, a portion of said first and second coils facing said elongated magnets;



a pair of third coils supported by each of said first and second coils and facing said elongated magnets, said third coils controlling positioning of said pickup unit in focusing and tilt directions;

a third bobbin rigidly connected to said slider and surrounding one of said second yoke plates; and

a fourth coil wound on said third bobbin and having a portion facing one of said elongated magnets, for controlling the advance of said pickup unit in a radial direction of a disk.

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**4,942,563**

## SIGNAL PROCESSING APPARATUS AND METHOD CAPABLE OF PROVIDING PRECISE DIGITAL DATA

**Mikio Yamamuro, Kawasaki, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Sep. 27, 1988, Ser. No. 249,928**

**Claims priority, application Japan, Sep. 30, 1987, 62-246095; Sep. 30, 1987, 62-246096; Sep. 30, 1987, 62-246097**

**Int. Cl.[5] G11B *7/00***

**U.S. Cl. 369—44.11** **9 Claims**

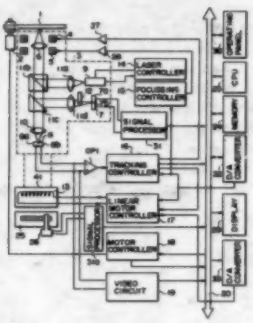
1. An apparatus for processing signals from a detector, the detector having at least first and second areas for generating electrical signals upon receiving a physical quantity, comprising:

first operation means for deriving out the sum of the electrical signals from at least the first and second areas of the detector to generate a first operation signal, the first operation signal having a predetermined amplitude;

second operation means for deriving out the difference between the electrical signals from at least the first and second areas of the detector to generate a second operation signal; and

converting means for converting the second operation signal

generated by the second operation means into digital data in accordance with a conversion gain determined by the



amplitude of the first operation signal generated by the first operation means.

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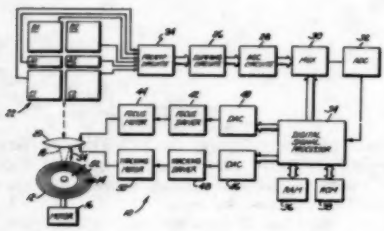
4,942,564

## SERVO SYSTEM GAIN COMPENSATION METHOD FOR MAGNETO-OPTIC DISK DRIVES

Gregory V. Hofer, Colorado Springs, and James C. McDonald, Black Forest, both of Colo., assignors to Hewlett-Packard Company, Palo Alto, Calif.

Filed Oct. 31, 1988, Ser. No. 265,219
Int. Cl.[5] G11B 7/00
U.S. Cl. 369—58 21 Claims



1. A method for operating programmable processing means in an optical disk drive to compensate servo system gain, including:

receiving a servo error signal;

outputting a servo control signal;

storing data characteristic of a desired servo system gain at a predetermined test frequency;

generating a test signal at the test frequency;

summing the test signal and the servo error signal;

determining current servo system gain at the test frequency;

computing a gain factor as a function of the current servo system gain and desired servo system gain;

storing data characteristic of the gain factor; and

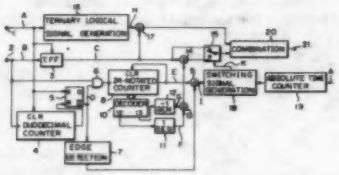
multiplying the servo error signal by the gain factor so the servo system gain equals the desired servo system gain.

4,942,565

## APPARATUS FOR RECORDING A WOBBLING, SPIRAL GUIDE GROOVE ON AN OPTICAL DISC

Roger Lagadec, Kanagawa, Japan, assignor to Sony Corporation, Tokyo, Japan

Continuation of Ser. No. 102,009, Sep. 28, 1987, abandoned. This application Jul. 28, 1989, Ser. No. 387,425
Claims priority, application Japan, Sep. 30, 1986, 61-232741
Int. Cl.[5] G11B 1/24
U.S. Cl. 369—59 6 Claims



1. Apparatus for forming a wobbling, substantially spiral pregroove on a disc-shaped recording medium for use as a tracking guide when subsequently recording data on the recording medium, said apparatus comprising:

means for rotating said disc-shaped recording medium;

a laser beam source for generating a laser beam;

means for moving said laser light beam source radially relative to said disc-shaped recording medium;

optical means for guiding said laser beam to said disc-shaped recording medium, said optical means including deflecting means for deflecting said laser beam in a radial direction of said disc-shaped recording medium in response to a modulated control signal while said disc-shaped recording medium rotates and said laser light beam source moves radially relative to said recording medium, whereby a wobbling, substantially spiral tracking guide pregroove is formed on said disc-shaped recording medium; and

control signal generating means connected to receive a first signal that has a first predetermined frequency and to receive a coded information second signal that has a second predetermined frequency at least an order of magnitude lower than said first predetermined frequency, said modulated control signal being generated by superimposing said second signal on said first signal, said modulated control signal being fed to said deflecting means for causing said laser light beam to wobble as the substantially spiral pregroove is formed on said recording medium in accordance with said modulated control signal.

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4,942,566

## DEVICE FOR ILLUMINATING AN AUXILIARY TRACK OF A MOTION PICTURE FILM

Bruno Godard, Les Ulis, France, assignor to Societe anonyme dite: Compagnie Generale d'Electricite, Paris, France

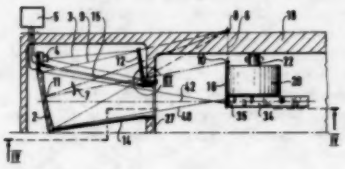
Filed Jun. 20, 1988, Ser. No. 208,617
Claims priority, application France, Jun. 19, 1987, 87 08618
Int. Cl.[5] G11B 7/00
U.S. Cl. 369—113 16 Claims

1. An illuminating device for illuminating an auxiliary track of a motion picture film running in a run direction, over at least one read window which is elongate along a read line transverse to said run direction, the length of said read window being at least equal to the width of said auxiliary track, said device comprising:

a source of light for forming an incident light beam having a virtual point origin on said read line and propagating along a mean incident direction; and

an optical system for forming said incident light beam into an illuminating beam focused on said film in order to illuminate said area in the plane of said film corresponding to said read window, said optical system comprising a con-

cave focusing mirror having a reflecting surface which has a center point and which is a portion of a surface of revolution about an axis of revolution which coincides with said read line, such that all light rays coming from said point origin and irradiating said reflecting surface are reflecting towards said line, with a normal to the center



point of said mirror forming a mean angle of inclination with said mean incident direction, said angle of inclination and the angular extent of said mirror on either side of said center point in a plane passing through said read line being such that the beam reflected by said mirror illuminates the entire length of the read window.

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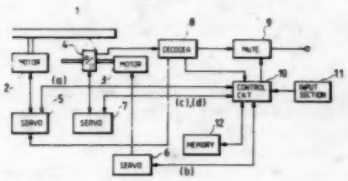
**4,942,567**

## DISK REPRODUCING METHOD

**Takahumi Shiba, Saitama, Japan, assignor to Pioneer Electronic Corporation, Tokyo, Japan**

**Filed Feb. 26, 1988, Ser. No. 160,807**
**Claims priority, application Japan, Feb. 27, 1987, 62-46357**
**Int. Cl.[5] G11B *7/00***
**U.S. Cl. 369—124** **3 Claims**



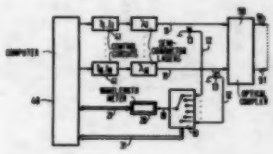
1. A disk reproducing method, comprising the steps of:
rotating a disk with a spindle motor;
controlling the rotation of said spindle motor with a first servo circuit;
reproducing data on said disk by tracking said disk with a pickup;
controlling the tracking of said pickup with a second servo circuit wherein said tracking is controlled by adjusting a gain of said second servo circuit;
driving said pickup with a slider motor radially of said disk;
controlling the rotation of said slider motor with a third servo circuit, said rotation being controlled by adjusting said third servo circuit in communication with said second servo circuit; and
when said first servo circuit is maintained at other than a predetermined speed for a first predetermined period of time, turning off said second and third servo circuits for a second predetermined period of time and then turning said second and third servo circuits back on.

**4,942,568**

## OPTICAL TRANSMISSION DEVICE

**Giok D. Khoe, and Ching K. Wong, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Jan. 13, 1988, Ser. No. 143,872**
**Claims priority, application Netherlands, Jan. 19, 1987, 8700108**
**Int. Cl.[5] H04B *10/04*; H04J *14/02***
**U.S. Cl. 370—3** **7 Claims**



1. An optical transmission device comprising:
a. a plurality of semiconductor lasers for transmitting an equal plurality of respective radiation beams modulated with respective information streams and having respective wavelengths which are different for each information stream;
b. a measuring system for measuring each wavelength including:
i. a selection device for successively and temporally selecting the respective radiation beams one at a time; and
ii. a wavelength meter for determining the wavelength of a current one of the respective radiation beams selected by the selection device; and,
c. a control device for influencing the wavelengths of the semiconductor lasers as a function of a signal generated by the measuring system;
wherein the selection device is a switching device for establishing and interrupting a respective radiation path from each respective semiconductor laser to the wavelength meter.

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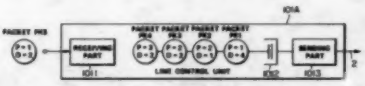
**4,942,569**

## CONGESTION CONTROL METHOD FOR PACKET SWITCHING APPARATUS

**Junichi Maeno, Akikawa, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Feb. 24, 1989, Ser. No. 314,865**
**Claims priority, application Japan, Feb. 29, 1988, 63-46812**
**Int. Cl.[5] H04J *3/26***
**U.S. Cl. 370—60** **6 Claims**

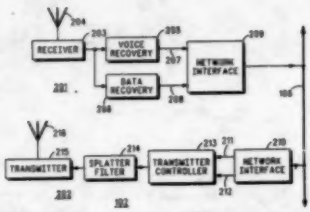


1. In a packet switching apparatus interconnected by associated communication lines to one or more other packet switching apparatuses, wherein data packets are output from various types of terminals and are temporarily held in a queue for exchange between the packet switching appartuses, a congestion control method comprising the steps of:
attaching a plurality of types of priority data indicating different priorities for different demands to each of the data packets; and
controlling the queue when a new data packet is input to the queue to satisfy major demands for the data packets concurrently according to said plurality of types of attached priority data of said new data packet and of all the data packets held in the queue.

## 4,942,570
## MULTIPLE CONTROL SLOT TDM/FDM COMMUNICATION SYSTEM

Michael D. Kotzin, Buffalo Grove; Kenneth J. Crisler, Wheaton; Lawrence M. Mohl, Hoffman Estates; Theodore Saltzberg, Chicago; Daehyoung Hong, Hanover Park, all of Ill., and Anthony P. Van den Heuvel, Parkland, Fla., assignors to Motorola, Inc., Schaumburg, Ill.

Filed Jan. 23, 1989, Ser. No. 300,392
Int. Cl.[5] H04J 3/16
U.S. Cl. 370—80 17 Claims




1. A time division multiplexed communication system for allowing communications between two or more communication units, on a communication channel, wherein said system supports a plurality of TDM frames on said communication channel, and wherein each of said TDM frames includes a plurality of time slots, wherein at least some of said time slots substantially support said communications and at least two of said time slots in each TDM frame on said communication channel each substantially support independent communication control information, such that a communication unit need only receive one of the at least two of said time slots per TDM frame in order to receive communication control information relevant to that communication unit.

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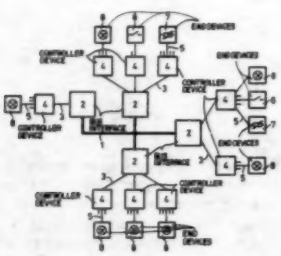
## 4,942,571
## ON-BOARD NETWORK FOR MOTOR VEHICLES

Antonius Möller, Delmenhorst; Herbert Reimann, Oldenburg; Bernhard Schürmann, Brake, and Gerold Wilts, Ovelgoenne, all of Fed. Rep. of Germany, assignors to Bergmann Kabelwerke AG, Berlin & Brake, Fed. Rep. of Germany

Filed Sep. 8, 1988, Ser. No. 241,612
Claims priority, application Fed. Rep. of Germany, Sep. 8, 1987, 3730468
Int. Cl.[5] H04J 3/02
U.S. Cl. 370—85.1 15 Claims




12. A method for operating an on-board network for motor vehicles with multiplex control for switching, monitoring and controlling a plurality of end devices, wherein the network comprises a plurality of control devices, each control device being connected to end devices in a star configuration, and having signal converters for exchanging end device signals with at least one end device; a plurality of bus interfaces, each bus interface being connected to said control devices in a star configuration, each bus interface having first transmitter/-receiver means for exchanging control device signals with at least one of said control devices, second transmitter/receiver means and processor means connecting said first and second transmitter/receiver means; and a common bus, said bus interfaces being connected to said common bus through said second transmitter/receiver means for exchanging data signals amongst said bus interfaces, said bus interfaces operating substantially independently of one another; the method comprising transmitting from each bus interface signals on the common bus in response to control signals from the signal converters of the associated control devices and internal system states of the bus interface and of the control devices in a cycle, and interrupting the cycle each time a state to be transmitted changes, and transmitting the changed state.

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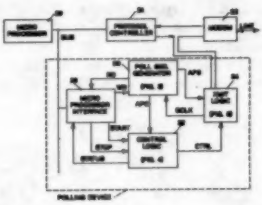
## 4,942,572
## PROCESS AND DEVICE FOR HIGH SPEED POLLING

Jean-Louis Picard, La Colle sur Loup, France, assignor to International Business Machines Corporation, Armonk, N.Y.

Continuation of Ser. No. 139,406, Dec. 29, 1987, abandoned.
This application Jun. 26, 1989, Ser. No. 372,146
Claims priority, application France, Dec. 30, 1986, 86430055
Int. Cl.[5] H04J 3/24
U.S. Cl. 370—85.8 3 Claims



1. A system for polling from a microprocessor controlled Communication Controller, N digital terminals made to communicate with said Controller via a high speed channel, said system including at the Controller site:

means sensitive to an order from said microprocessor for generating and broadcasting a specific pattern announcing subsequent polling operations;

a pseudo random generator sensitive to a subsequent order from said microprocessor for generating and broadcasting a first high rate equal to the bit rate, a random polling sequence of station addresses in which sequential station addresses are separated in time at the broadcasting rate by z bits of other station addresses where z is a whole number greater than or equal to 80.

sensing means within said microprocessor controlled Communication Controller for monitoring the message received back from the terminals;

inhibit means connected to said sensing means for subsequently broadcasting an inhibit message for inhibiting further message sending from the terminals upon a received message being detected by said sensing means;

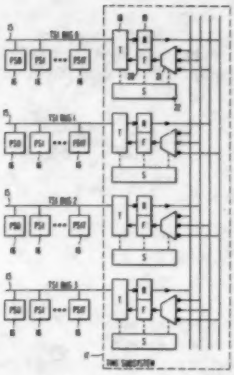
validity checking means sensitive to said sensing means for checking the validity of said received message; and

means sensitive to an invalidity being reported by said validity checking means for switching said polling to a second low rate polling means.

## 4,942,573
## LOOSELY COUPLED PARALLEL NETWORK SIMULATOR

**Thomas R. Woodward, West Chester, Pa., assignor to Unisys Corporation, Blue Bell, Pa.**

**Filed Mar. 25, 1987, Ser. No. 30,024**
**Int. Cl.[5] H04J** *3/02*
**U.S. Cl. 370—85.9** **7 Claims**



1. A network simulator for simulating a plurality of parallel processing networks, said simulator comprising:

a plurality of buses for transmitting information segments to processing sites;

each of said buses includes data line means to transmit an information segment, at least one control line means to transmit control information related to said information segment; and

a reply line means for indicating that another processing site is coupled to said bus to receive said information segment; and

a plurality of sets of processing sites each set being coupled to a given one of said plurality of buses, each processing site having a processor means and interface means coupling said processor to said bus; and

clock means coupled to each of said interface means to synchronize time intervals during which said respective interface means couples it corresponding processor means to its corresponding bus; and

time multiplex switching means coupled to each of said buses to receive an information segment from one of said buses for transmission on another of said buses; and

each of said interface means including sequencing means coupled to said clock means to select during which time interval the corresponding processor means is to be coupled to its respective bus.

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## 4,942,574
## CONCURRENT RESOURCE REQUEST RESOLUTION MECHANISM

**Bruce R. Zelle, Naperville, Ill., assignor to American Telephone and Telegraph Company, AT&T Bell Laboratories, Murray Hill, N.J.**

**Filed Mar. 31, 1988, Ser. No. 175,695**
**Int. Cl.[5] H04L** *5/00*
**U.S. Cl. 370—85.15** **3 Claims**

1. A resource allocation arrangement for allocating ones of a plurality of resources comprising:

a plurality of controller means; and

data ring means connected to each of said controller means for transmitting availability data for each of said resources among said controller means;

each of controller means comprising:

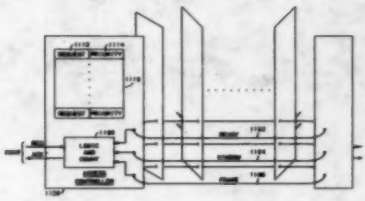
buffer means for storing a requested resource identification;

interface means for receiving data from and transmitting data to said ring means; and

means for checking a list of requested resources against availability data received by said interface means from said ring means;

wherein said data ring means further comprises means for transmitting priority window data for each of said resources;

wherein said interface means is responsive to said checking means for storing a priority indication for one of said requested sources that is found to be busy while said priority window is open;



wherein said interface means comprises means responsive to said checking means for seizing one of said requested resources that is found to be available in said availability data if a priority indicator for said requested resource for said means for checking is stored or if said priority window is open by transmitting availability data indicating unavailability for said one requested resource to said rings means for transmission to a next controller means connected to said rings means; and

wherein each of said controllers controls a set of controlled resources and wherein said interface means comprises means for copying an availability state to said priority window data for each member of said set of controlled resources.

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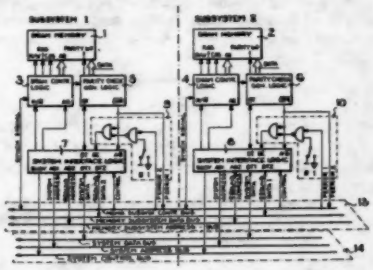
## 4,942,575
## ERROR CONNECTION DEVICE FOR PARITY PROTECTED MEMORY SYSTEMS

**William E. Earnshaw, N. Lauderdale; Jay Howell, Margate, and Paul B. Ripy, N. Lauderdale, all of Fla., assignors to Modular Computer Systems, Inc.**

**Filed Jun. 17, 1988, Ser. No. 207,874**
**Int. Cl.[5] G06F** *11/14*
**U.S. Cl. 371—10.1** **7 Claims**



1. A memory system with error detection and correction circuitry for returning error free data to a main system bus, comprising:

two memory subsystems each for performing read and write operations; and

error detection and correction means coupled between said two memory subsystems for allowing only one of said memory subsystems to return error free data to the main bus system as long as at least one of said two memory subsystems contains error free data.

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**4,942,576**

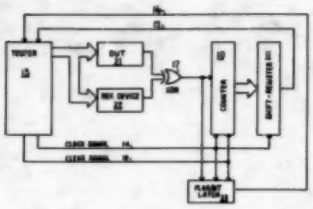
**BADBIT COUNTER FOR MEMORY TESTING**

**Jon P. Busack; Gary M. Johnson, and Richard R. Clem, all of Boise, Id., assignors to Micron Technology, Inc., Boise, Id.**

**Filed Oct. 24, 1988, Ser. No. 261,611**

**Int. Cl.[5] G01R *31/28***

**U.S. Cl. 371—21.2** **4 Claims**



1. Apparatus for real-time recognizing and counting of digital device badbits in which a digital device under test (DUT) has at least one output, the apparatus comprising:

a reference device, having an operating format corresponding to that of the DUT;

a tester, providing clocking to exercise the DUT;

the DUT and the reference device responsive in parallel to the tester;

a comparing device, having a first input responsive to the DUT output, having a second input responsive to the reference device output, and having an output signal whose first state indicates that the first and second inputs are equivalent, and whose second state indicates that the first and second inputs are not equivalent, said inequivalencies being called badbits;

a counter, having an input responsive to the comparing device output, counting badbits recognized by the comparing device;

a flagbit latch, responsive to an initial digital transition of the comparing device output, indicating the occurrence of at least one badbit;

the tester being responsive to one or more outputs of the apparatus;

a conversion device having at least one input of a first sense and at least one output of a second sense, the inputs responsive to the counter outputs, for converting the count from the first sense to the second sense, the tester being responsive in said second sense to the conversion device output.

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**4,942,577**

**LOGIC CIRCUIT SYSTEM WITH LATCH CIRCUITS FOR RELIABLE SCAN-PATH TESTING**

**Hideharu Ozaki, Tokyo, Japan, assignor to NEC Corporation, Tokyo, Japan**

**Filed Apr. 21, 1988, Ser. No. 184,315**

**Claims priority, application Japan, Apr. 21, 1987, 62-98816**

**Int. Cl.[5] G01R *31/28***

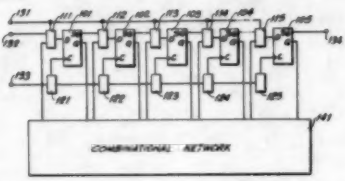
**U.S. Cl. 371—22.3** **9 Claims**

1. A logic circuit system comprising:

a plurality of logic circuits;

a plurality of latch circuits each having an input terminal, a first output terminal, a second output terminal and a clock terminal and including a flip-flop and a delay circuit, said flip-flop having a data input node connected to said input terminal, a data output node connected to said first output terminal and a clock input node connected to said clock terminal, said delay circuit having an input node connected between said data output node of said flip-flop and said second output terminal, said first output terminal being further connected to one of said logic circuits to apply a signal at said first output terminal to said one logic circuit;

a plurality of selectors having a first selector input terminal connected to said second output terminal, a second selector input terminal connected to a different one of said logic circuits to receive a signal from said different one




logic circuit, a selector output terminal connected to said input terminal, and a control signal terminal;

a control means for producing a control signal to be applied to said control signal terminal to selectively connect said selector output terminal to one of said first and second selector input terminals, said plurality of latch circuits being connected to form a shift-register when said selector output terminal is connected to said first selector input terminal and being connected to form a logic circuit with said plurality of logic circuits when said selector output terminal is connected to said second selector input terminal; and

means for applying a clock signal to said clock input node to operate the flip-flops of said latch circuits.

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**4,942,578**

**BUFFER CONTROL METHOD AND APPARATUS**

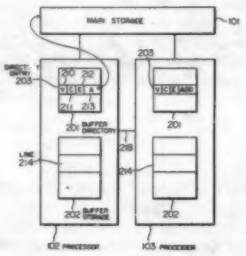
**Kouji Nakamura, Hadano, Japan, assignor to Hitachi, Ltd., Tokyo, Japan**

**Filed Jul. 5, 1988, Ser. No. 215,036**

**Claims priority, application Japan, Jul. 6, 1987, 62-167107**

**Int. Cl.[5] G06F *11/00***

**U.S. Cl. 371—36** **8 Claims**




1. A buffer control apparatus for controlling a buffer storage in each of a plurality of processors sharing a main storage by use of control means, said apparatus comprising:

(a) a cache storage for storing data therein;

(b) a cache directory connected to the cache storage having a plurality of entries corresponding to line positions of the cache storage;

each of said entries storing a validity bit, a main storage

address, an exclusive bit for indicating whether the line is occupied or not, and a change bit for indicating whether data has been written into the line or not; and

(c) means for checking validity of one of the validity bit, the change bit and the exclusive bit based on a content of others of the validity bit, the change bit and the exclusive bit than the one, said means for checking being arranged to receive the one from the cache directory.

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**4,942,579**

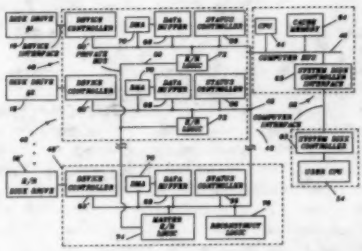
**HIGH-SPEED, HIGH-CAPACITY, FAULT-TOLERANT ERROR-CORRECTING STORAGE SYSTEM**

**Theodore J. Goodlander; Jose M. Valdepenas; Ricardo E. V. McCaskey, and Gerardo Vizcaino, all of Nashua, N.H., assignors to Cab-Tek, Inc., Nashua, N.H.**

**Continuation of Ser. No. 57,346, Jun. 2, 1987, abandoned. This application Feb. 27, 1989, Ser. No. 317,048**

**Int. Cl.[5] G06F *11/10, 11/16***

**U.S. Cl. 371—51** **9 Claims**



1. In a high-capacity, error-correcting virtual disk drive storage device for a computer comprising:

a single interfacing logic portion for interfacing with a user CPU, the interfacing logic portion including disk drive controller interface means for interfacing with a standard disk drive controller through which the user CPU is connected to the virtual disk drive storage device;

a plurality of standard disk drives adapted to interface with a standard disk drive controller at an input interface thereof,

a plurality of disk drive controllers connected between the interfacing logic portion and respective ones of the plurality of disk drives, each of the disk drive controllers including controller interface means for presenting a standard system disk drive controller interface to the input interface of its respective disk drive, a data buffer for transferring data to and from its respective disk drive, and parity generator means for generating a parity bit for standard length groups of bits being transferred to its respective disk drive;

virtual disk drive parity generation means for generating parity bits associated as part of data groupings of bits being transferred to the disk drives; and,

reconstruct logic means for sensing a parity error condition from one of the disk drives in combination with a parity error in one of the data groupings of bits as indicated by a parity bit generated by the virtual disk drive parity generation means and for using the knowledge of which of the disk drives' data is in error in combination with the parity bit generated by the virtual disk drive parity generation means to logically reconstruct an erroneous bit creating the joint parity error condition, the improvement for assuring high-speed operation of the virtual disk drive storage device comprising:

(a) the data buffers in combination comprising FIFO buffer means for holding a plurality of sequential data groupings; and,

(b) the disk drive controllers each including data transfer logic for transferring respective ones of a sequence of the data groupings from their respective disk drives into said FIFO data buffer means asynchronously and for informing the standard disk drive controller through which the user CPU is connected to the virtual disk drive storage device that a requested read operation is complete only when there are sufficient ones of the sequence of the data groupings being read from all the disk drives to assure that the user CPU cannot remove the sequence of the data groupings being read from all the disk drives from said FIFO data buffer means faster than remaining ones of the sequence of the data groupings being read from all the disk drives are read asynchronously into said FIFO data buffer means.

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**4,942,580**

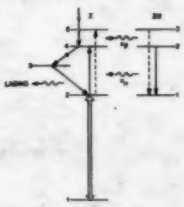
**X-RAY LASER WITH ENHANCED X-RAY GAIN THROUGH PHOTODEPOPULATION**

**Raymond C. Elton, Potomac, Md., assignor to The United States of America as represented by the Secretary of the Navy, Washington, D.C.**

**Filed Sep. 29, 1989, Ser. No. 414,499**

**Int. Cl.[5] H01S *3/30***

**U.S. Cl. 372—5** **14 Claims**



1. An x-ray laser comprising:

a first plasma having a nuclear charge Z;

a second plasma having a nuclear charge Z/2 emitting photons;

means for ionizing said first plasma; and

means for cooling said first plasma for recombination pumping;

wherein n=2 electrons of said first plasma are excited by said photons of said second plasma, thereby decreasing a population density $N_2$ of said first plasma.

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**4,942,581**

**OPTICAL PHASE DETECTION AND CONTROL SYSTEM**

**Sarah R. Harrell, Palm Beach, and John D. Rowland, Lake Park, both of Fla., assignors to United Technologies Corp., Hartford, Conn.**

**Filed Jan. 27, 1989, Ser. No. 303,628**

**Int. Cl.[5] H01S *3/10***

**U.S. Cl. 372—9** **10 Claims**

1. A system for determining a phase relationship between two coherent beams, and when the beams are not in phase, providing a correction output to bring them into phase, said system comprising:

means for combining said beams to create an interference

fringe pattern, said pattern exhibiting, when said beams are in phase, a central peak irradiance fringe bounded on either side by lesser peak irradiance fringes, said fringe pattern responding to a change in relative phase of said beams, to move in one direction or the other depending upon a direction of phase change between said beams;

first and second side fringe detection means positioned to detect said lesser peak irradiance fringes, but not said central peak irradiance fringe, and to provide signals indicative of power in said lesser peak irradiance fringes; and

processor means for providing said correction output to bring said beams in phase when said signals indicate unequal power in said lesser peak irradiance fringes.

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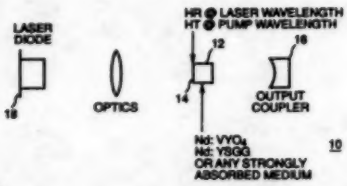
**4,942,582**

## SINGLE FREQUENCY SOLID STATE LASER

**Gregory J. Kintz; Thomas M. Baer, and James D. Kafka, all of Mountain View, Calif., assignors to Spectra-Physics, San Jose, Calif.**

**Filed Apr. 24, 1989, Ser. No. 341,922**
**Int. Cl.[5] H01S 3/098, 3/16**
**U.S. Cl. 372—18** **26 Claims**




1. A solid state laser having a single longitudinal mode output at a selected laser output wavelength, including:

a block of solid state laser material having a cavity-forming mirror coating on one of two opposing faces,

a pumping source for providing pump radiation at a wavelength such that its absorption depth in said block of solid state laser material is less than the dephasing; distance in said block of solid state laser material at said selected laser output wavelength divided by $2\pi$,

said cavity-forming mirror having a high reflectivity at said selected laser output wavelength and a high transmissiveness at the wavelength of said pump radiation,

means for collecting said pump radiation emitted from said pump source and for directing it into the one of the opposed ends of said block of solid state laser material having said cavity-forming mirror coating, and

an output coupler optically aligned with said block of solid state laser material such that said cavity-forming mirror coating, said block of solid state laser material and said output coupler form a cavity, said output coupler being partially transmissive a said laser output wavelength.

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**4,942,583**

## MISALIGNMENT-TOLERANT, GRATING-TUNED EXTERNAL-CAVITY LASER

**Moshe Nazarathy, Palo Alto; Paul Zorabedian, Mountain View; William Richard, Atherton, and Tirumala R. Ranganath, Palo Alto, all of Calif., assignors to Hewlett-Packard Company, Palo Alto, Calif.**

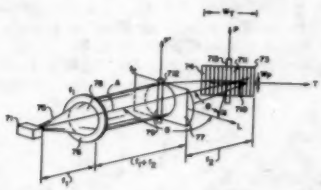
**Filed Jun. 17, 1988, Ser. No. 208,340**
**Int. Cl.[5] H01S 3/10**
**U.S. Cl. 372—20** **19 Claims**

1. A grating tuned laser system comprising:

a laser amplifier (71) that emits a laser beam (75) along an optical axis A, said laser beam having a pair of lateral dimensions $W_P$ and $W_T$ where $W_P$ is measured along a direction parallel to an axis P perpendicular to optical axis A and $W_T$ is measured along a direction parallel to an axit T perpendicular to axes A and P, said lateral dimensions $W_P$ and $W_T$ being referred to herein as laser beam height and width, respectively;

a grating (73) positioned in the path of said laser beam (75) and oriented relative to said laser amplifier to produce a diffraction order that retroreflects back to the laser amplifier (71), thereby forming an external cavity with said laser amplifier (71);

wherein said grating (73) is rotatable about axis P to enable tuning of the laser amplifier (71);



wherein said grating (73) contains a set of grating rulings (74) that are substantially parallel to axis P; and

wherein a normal N to a front face (711) of the grating (73) at the intersection of the optical axis with the grating (73) makes an angle $\theta$ with the optical axis A at the grating;

optical relay means, positioned in the path of said laser beam between the laser amplifier and the grating, for reducing the ratio of laser beam height to laser beam width to produce on said grating (73) a laser spot (710) having a ratio of height $W_P$ to width $W_T$ much less than 1.

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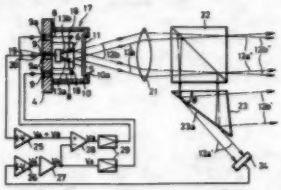
**4,942,584**

## SEMICONDUCTOR LASER APPARATUS DRIVING SYSTEM

**Morihiro Kuroki; Masahisa Shinoda, and Yasuyuki Satou, c/o Mitsubishi Denki Kabushiki Kaisha Denshi Shohin Kaihatsu Kenkyusho 1 Babazusho, Nagaokakyo-shi, Japan**

**Filed Jun. 16, 1989, Ser. No. 368,034**
**Claims priority, application Japan, Jun. 22, 1988, 63-152423; Jun. 28, 1988, 63-158070; Jul. 12, 1988, 63-171965; Aug. 3, 1988, 63-192669**
**Int. Cl.[5] H01S 3/10**
**U.S. Cl. 372—29** **15 Claims**



1. A semiconductor laser apparatus driving system, comprising:

a semiconductor laser apparatus including a plurality of semiconductor laser beam sources;

a first photodetector for receiving backward beams from said plurality of semiconductor laser beam sources collectively;

means for optically separating only one of forward beams from said plurality of semiconductor laser beam sources from said forward beams;

a second photodetector for receiving said separated one forward beam; and

means for determining the magnitude of at least one of said

forward beams from output signals of said first and second photodetectors.

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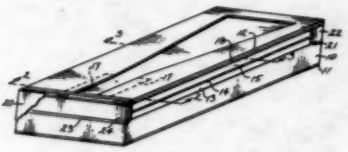
4,942,585
HIGH POWER SEMICONDUCTOR LASER
Jeffrey E. Ungar, Los Angeles, Calif., assignor to Ortel Corporation, Alhambra, Calif.
Filed Dec. 22, 1987, Ser. No. 138,557
Int. Cl.[5] H01S 3/19
U.S. Cl. 372—44 12 Claims



1. A semiconductor laser comprising:
an elongated active gain medium layer;
a relatively narrower mirror facet at one end of the gain layer;
an output facet at the other end of the gain layer sufficiently aligned with the mirror facet for Fabry-Perot oscillation between the facets, the output facet being relatively wider than the mirror facet;
means adjacent to only the mirror facet for pumping a parallel edged index guided portion of the gain layer for stimulated emission of radiation in a mode selecting waveguide portion of the gain layer; and
means for pumping a diverging portion of the gain layer between the parallel edged portion and the output facet for stimulated emission of radiation.

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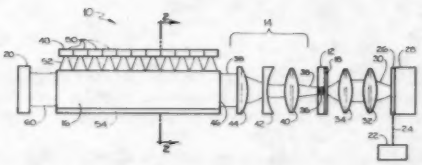
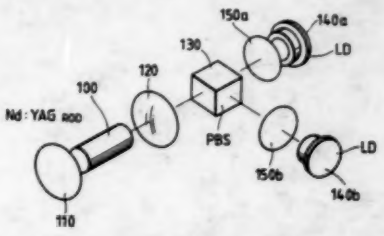
4,942,586
HIGH POWER DIODE PUMPED LASER
Shui T. Lai, Del Mar, Calif., assignor to Intelligent Surgical Lasers Inc., San Diego, Calif.
Filed Apr. 25, 1989, Ser. No. 343,949
Int. Cl.[5] H02S 3/14
U.S. Cl. 372—68 29 Claims



1. A device for generating a laser beam having a single cavity which comprises:
a high gain madium for generating a control laser beam;
a low gain medium;
a longitudinal linear laser diode array for pumping said low gain medium to establish a predetermined gain volume defining a reservoir of excited ions; and
a beam expander disposed between said high gain medium and said low gain medium for focusing said control beam onto said low gain medium to substantially fill said predetermined volume and generate a high power laser beam.

4,942,587
OPTICALLY PUMPED SOLID-STATE LASER OSCILLATOR
Makoto Suzuki, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Aichi, Japan
Filed Mar. 10, 1989, Ser. No. 321,866
Claims priority, application Japan, Mar. 10, 1988, 63-56898
Int. Cl.[5] H01S 3/091
U.S. Cl. 372—71 6 Claims




1. An optically pumped solid-state laser oscillating device comprising:
an optical resonator for outputting a laser beam of a predetermined wavelength, said optical resonator having a predetermined optical absorption band and being excited in response to a light having a wavelength falling within said optical absorption band; and
a plurality of excitation light sources for emitting a plurality of semiconductor laser beams and applying said laser beams to said optical resonator, said plurality of semiconductor laser beams having wavelengths different from one another.

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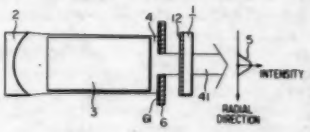
4,942,588
LASER DEVICE
Koji Yasui; Masaaki Tanaka, and Masaki Kuzumoto, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Japan
Continuation of Ser. No. 932,348, Nov. 19, 1986, abandoned.
This application Jul. 10, 1989, Ser. No. 377,774
Claims priority, application Japan, Nov. 20, 1985, 60-260345; Nov. 25, 1985, 60-264528; Nov. 25, 1985, 60-264529; Nov. 25, 1985, 60-264530; Nov. 25, 1985, 60-264531; Dec. 23, 1985, 60-290143
Int. Cl.[5] H01S 3/08
U.S. Cl. 372—103 36 Claims



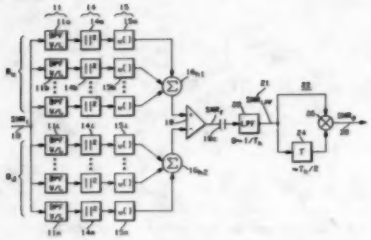

1. In a laser device, an optical resonator comprising a first end including a total reflection mirror having a total reflection surface and a second end including a partial reflection mirror having a partial reflecting surface, said total and partial reflection surfaces directly facing each other and forming a first resonant optical cavity; and
aperture means disposed within the first resonant optical cavity between the first and second ends including a first surface and a second surface directly facing said total and partial reflecting surfaces, respectively, an opening through which a laser beam may pass, and a total reflection portion disposed on said first surface surrounding the opening, said total reflection portion and said total reflection surface directly facing each other and forming a second resonant optical cavity.

**4,942,589**

## CHANNELIZED BINARY-LEVEL HOP RATE DETECTOR

**Patrick J. Smith; Ronald S. Leahy, both of Salt Lake City, Utah, and Scott R. Bullock, Cos, Colo., assignors to Unisys Corporation, Blue Bell, Pa.**

**Filed Oct. 4, 1989, Ser. No. 417,175**
**Int. Cl.[5] H04K 1/00**
**U.S. Cl. 375—1** **12 Claims**



10. Apparatus for receiving a frequency-hopped signal comprising in combination:

(a) means for receiving a broad band of frequency signals which encompass a frequency-hopped information signal sequence;

(b) dividing means for channeling said frequency signals into a plurality of sub-bands wherein each sub-band carries a portion of said information signal sequence, said dividing means being split into an upper group and lower group of sub-bands;

(c) a plurality of signal squaring circuits wherein each signal squaring circuit multiplies its portion of said information signal sequence by its own amplitude and transmits it to an associated quantizer circuit unit;

(d) a plurality of quantizer circuit units where each quantizer circuit unit receives the particular power level estimate from its associated squaring circuit and matches it against a preset threshold level, whereupon, if the input signal exceeds the threshold level, the quantizer unit develops a positive voltage output, but a zero volt output if the threshold is not exceeded;

(e) an upper summation circuit unit for adding up the outputs of each one of said upper group of quantizer circuit units to provide a first totality;

(f) a lower summation circuit unit for adding up the outputs of each one of said lower group of quantizer circuit units to provide a second totality;

(g) differential amplifier means for subtracting said second totality from said first totality and providing a difference signal to a low pass filter means; and

(h) delay and multiply circuit means for receiving the output of said low pass filter means, and generating a final output signal representative of the frequency hop rate of the transmitted information signal.

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**4,942,590**

## OPTIMUM CLOCK GENERATOR IN DATA COMMUNICATION

**Hisashi Terada, Kawasaki, Japan, assignor to Kabushiki Kaisha Kenwood, Tokyo, Japan**

**Filed Oct. 27, 1988, Ser. No. 263,365**
**Claims priority, application Japan, Oct. 30, 1987, 62-274825**
**Int. Cl.[5] H04K 1/00**
**U.S. Cl. 375—1** **2 Claims**

1. A spread spectrum communication receiver comprising:

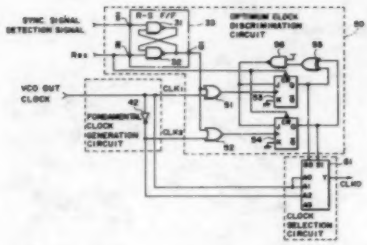
means in response to a received spread spectrum signal for detecting an initial synchronization time point by referring to a PN code in the received spread spectrum signal;

means for generating a clock signal;

means in response to the clock signal for generating a PN code signal;

means for controlling said PN code generating means to hold the synchronization of the generated PN code signal with the received spread spectrum signal; and

means for decoding the received spread spectrum signal by using the generated PN code signal which is in synchronization with the received spread spectrum signal, wherein



said clock signal generating means for selecting as the clock signal one of a plurality of clock signals having different respective phases in response to the detection of the initial synchronization time point with the selected clock signal having an active transition which takes place after the initial synchronization timing point earlier than the remaining clock signals.

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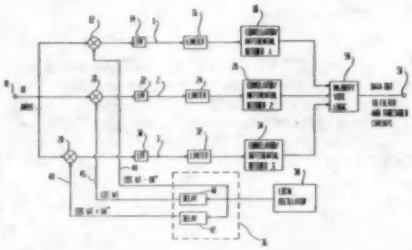
**4,942,591**

## MULTIPLE PHASE PSK DEMODULATOR

**Greg A. Nease, Windsor, N.J., and Peter K. Cripps, New Hope, Pa., assignors to Agilis Corporation, Mountain View, Calif.**

**Filed Mar. 7, 1989, Ser. No. 320,295**
**Int. Cl.[5] H04L 27/22**
**U.S. Cl. 375—84** **14 Claims**



1. A method for use in a spread spectrum system for demodulating a differentially encoded spread spectrum spreading code sequence phase modulated on a carrier signal frequency, said method comprising:

converting said phase modulated carrier signal frequency to a first baseband signal using a local oscillator frequency having a first phase;

differentially decoding said first baseband signal to provide a first differentially decoded spread spectrum spreading code sequence output signal;

converting said phase modulated carrier signal frequency to a second baseband signal using a local oscillator frequency having a second phase;

differentially decoding said second baseband signal to provide a second differentially decoded spread spectrum spreading code sequence output signal;

converting said phase modulated carrier signal frequency to

a third baseband signal using a local oscillator frequency having a third phase;

differentially decoding said third baseband signal to provide a third differentially decoded spread spectrum spreading code sequence output signal; and

selecting two of said first, second and third differentially decoded spread spectrum spreading code sequence output signals which have substantially the same logic output logic signal level, as the correct differentially decoded spread spectrum spreading code sequence output signal.

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**4,942,592**

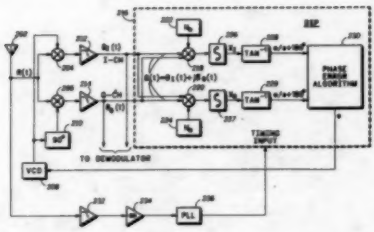
## SYNCHRONOUS RECEIVER FOR MINIMUM SHIFT KEYING TRANSMISSION

**Clifford D. Leitch, Coral Springs, and Francis R. Steel, deceased, late of Parkland, Fla. (by Lynne A. Steel, legal representative), assignors to Motorola, Inc., Schaumburg, Ill.**

**Continuation of Ser. No. 202,617, Jun. 6, 1988, abandoned. This application Nov. 27, 1989, Ser. No. 443,096**

**Int. Cl.[5] H04L *27/14***

**U.S. Cl. 375—90** **20 Claims**



1. A receiver circuit for receiving an MSK transmission and for use with a quadrature circuit having a baseband signal output and including an oscillator, said receiver circuit comprising in combination:

multiplication/integration means for multiplying said baseband signal by an orthogonal function and for integrating the product of said baseband signal and said orthogonal function;

angle computing means for computing two supplementary angles from the integral of the product of said baseband signal and said orthogonal function; and

resolving means for resolving which one of said two supplementary angles is the phase error between the carrier of said MSK transmission and the ouput of said oscillator.

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**4,942,593**

## TELECOMMUNICATIONS INTERFACE WITH IMPROVED JITTER REPORTING

**Frank A. Whiteside, Coppell, and Michael D. Smith, Lewisville, both of Tex., assignors to Dallas Semiconductor Corporation, Dallas, Tex.**

**Filed Mar. 16, 1989, Ser. No. 324,153**

**Int. Cl.[5] H04L *7/027***

**U.S. Cl. 375—118** **49 Claims**

17. A communications receiver, for receiving incoming synchronous data streams, comprising:

a first clock recovery circuit, which generates a first estimated clock signal from the incoming data stream;

a second clock recovery circuit, which generates a second estimated clock signal from the incoming data stream, said second estimated clock signal being more highly filtered than said first estimated clock signal and having substantially the same average frequency as said first estimated clock signal;

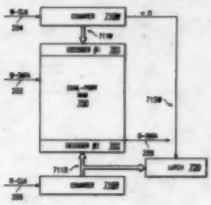
a serial-access memory, configured to operate such that

successive bits of the incoming data are written, with a timing governed by said first estimated clock signal, into address locations specified by the current value of a write-address-pointer which is incremented at each said write operation, and

successive bits are read out, with a timing governed by said second clock signal, from an address location specified by the current value of a read-address-pointer which is incremented at each said read operation;

and a counter,

clocked by said second estimated clock signal, and



having a reset input which is connected to reset whenever said write-address-pointer value crosses a predetermined value, and

having an output which is connected, through a latch circuit, to be latched whenever said read-address-pointer value crosses a predetermined value, the successive latched outputs of said counter providing an estimate of jitter.

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**4,942,594**

## METHOD FOR THE CHEMICAL DECONTAMINATION OF LARGE COMPONENTS AND SYSTEMS OF METALLIC MATERIALS OF NUCLEAR REACTORS

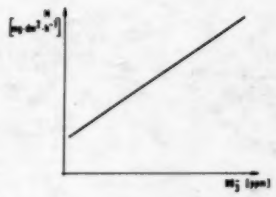
**Horst-Otto Bertholdt, Erlangen, and Bernhard Kress, Bubenreuth, both of Fed. Rep. of Germany, assignors to Siemens Aktiengesellschaft, Munich, Fed. Rep. of Germany**

**Filed Oct. 18, 1985, Ser. No. 788,781**

**Claims priority, application Fed. Rep. of Germany, Oct. 31, 1984, 3439857**

**Int. Cl.[5] G21F *9/00*; C23G *1/00***

**U.S. Cl. 376—310** **18 Claims**



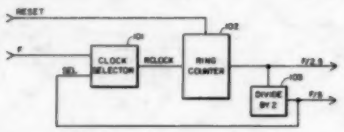
1. The method for the chemical decontamination of metallic elements of large components and systems of water-cooled nuclear reactors which essentially consists of only the single step of effecting the decontamination of the metallic material without addition of acids, by contacting the surfaces of said metallic materials by circulating through said systems an aqueous non-acidic solution essentially consisting of (a) at least one oxidizing chemical selected from the group consisting of chromataes, and cerium IV salts: (b) the water coolant for said reactor and (c) ozone.

**4,942,595**

## CIRCUIT FOR DIVIDING THE FREQUENCY OF A DIGITAL CLOCK SIGNAL BY TWO AND ONE-HALF

**Anthony J. Baca, Glendale, Ariz., assignor to AG Communication Systems Corporation, Phoenix, Ariz.**

**Filed Dec. 5, 1988, Ser. No. 280,060**
**Int. Cl.[5] H03K *21/02, 21/38, 23/48***
**U.S. Cl. 377—48** **5 Claims**




1. A divide by two and one half (2.5) circuit for receiving a first clock signal and an asynchronous reset signal, said divide by two and one half (2.5) circuit arranged to transmit a second clock signal that has a period two and one half (2.5) times said first clock signal, said divide by two and one half (2.5) circuit comprising:

clock selector means arranged to receive said first clock signal and to output a selected polarity of said first clock signal;

ring counter means having a predetermined number of stages arranged to receive said clock selector means output, and to transmit an output signal that has a period of 3 times (3x) the signal received from said clock selector means;

divide by two means arranged to receive said ring counter means output and to transmit an output signal that has a clock period of two times (2x) said ring counter means output signal, wherein said divide by two means output signal is input to said clock selector means and said ring counter means transmits said second clock signal; and

reset synchronizer means arranged to initialize said ring counter means to a seed value other than all said stages at logic zero, in response to said asynchronous reset signal.

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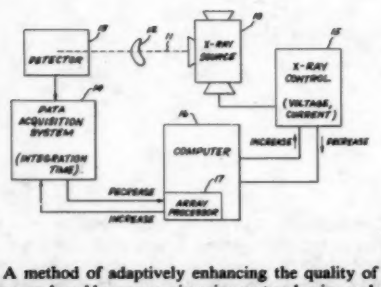
**4,942,596**

## ADAPTIVE ENHANCEMENT OF X-RAY IMAGES

**Jeffrey W. Eberhard, Schenectady; Rudolph A. A. Koegl, Niskayuna, and John P. Keavency, Schenectady, all of N.Y., assignors to General Electric Company, Schenectady, N.Y.**

**Filed Aug. 31, 1988, Ser. No. 238,806**
**Int. Cl.[5] H05G *1/34***
**U.S. Cl. 378—109** **14 Claims**




1. A method of adaptively enhancing the quality of x-ray images produced by an x-ray imaging system having a plurality of system operating parameters that are adjustable, comprising:

acquiring measured x-ray data for a subsection of an image of a part;

determining a signal to noise parameter of said measured data and comparing to predetermined acceptable limits;

adjusting one or more of said system operating parameters for a next subsection of said image to bring said signal to noise parameter within limits;

acquiring measured x-ray data in sequence for other image subsections while alternately adaptively selecting said system operating parameters to improve image quality; and

normalizing said acquired data to provide a single parameter for all subsections of said image.

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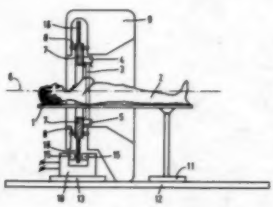
**4,942,597**

## X-RAY SCANNER COMPRISING A LINEAR ELECTRIC DRIVING MOTOR

**Paul A. F. Van Acker, and Alphonsus T. Van Der Velden, both of Eindhoven, Netherlands, assignors to U.S. Philips Corporation, New York, N.Y.**

**Filed Sep. 15, 1986, Ser. No. 907,692**
**Claims priority, application Netherlands, Sep. 17, 1985, 8502533**
**Int. Cl.[5] H05G *1/02***
**U.S. Cl. 378—197** **7 Claims**



1. An X-ray scanner comprising an X-ray source and an X-ray detector, which are driven together by a rotational driving system and are mounted in a supporting ring so as to be rotatable about a shaft extending through an examination space, characterized in that the driving mechanism is provided with a linear electric driving motor and characterized in that a stator part of the linear motor is provided with two magnet poles, an electrically conducting annular disk for driving purposes is freely rotatable between said two magnet poles, wherein said annular disk is secured to the supporting ring for the X-ray source and the detector.

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**4,942,598**

## TELEPHONE ANSWERING MACHINE IN PAGING SYSTEMS WITH AUTOMATIC NUMBER IDENTIFICATION BASED MESSAGE OPERATIONS

**Walter L. Davis, Coral Springs, Fla., assignor to Motorola, Inc., Schaumburg, Ill.**

**Filed Mar. 4, 1988, Ser. No. 164,039**
**Int. Cl.[5] H04M *1/64, 1/66, 11/00***
**U.S. Cl. 379—57** **13 Claims**

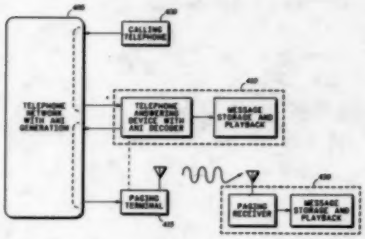
1. Telephone answering apparatus for a subscriber of a paging system, said apparatus coupled to a telephone network for automatically receiving telephone calls including corresponding paging messages directed to said subscriber, such telephone calls including corresponding source identification signals generated by the telephone network to identify the telephone numbers of the corresponding sources of the telephone calls, said apparatus also coupled to a paging terminal of said paging system, said paging terminal operative to transmit paging messages to a portable paging receiver of said subscriber, said apparatus comprising:

means for storing a set of predetermined source identification codes;

means coupled to the telephone network for automatically receiving telephone calls directed to said subscriber and for decoding the source identification signals thereof to

generate corresponding decoded source identification codes;

controller means coupled to said receiving means for selecting paging messages of the received telephone calls based on a correlation of the decoded source identification codes




of said telephone calls with at least one of said stored set of predetermined source identification codes; and

means for coupling to said paging terminal and governed by said controller means to direct said selected paging messages to said paging terminal for transmission to said subscriber's paging receiver.

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**4,942,599**

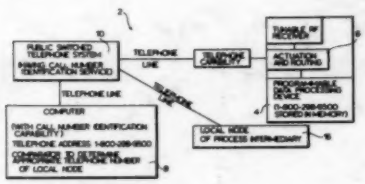
**LOCATION IDENTIFICATION**

**Alastair T. Gordon, and Michael H. Reichmann, both of Toronto, Canada, assignors to Alphanet Technology Corporation, Toronto, Canada**

**Filed Feb. 2, 1989, Ser. No. 305,445**

**Int. Cl.[5] H04M *11/00, 3/42***

**U.S. Cl. 379—93** **18 Claims**




1. A method for transmitting information to programmable data processing devices by means of a telephone system having Call Number Identification Service, each programmable data processing device having associated therewith a telephone capability, connected to a telephone line; said method comprising with respect to each programmable data processing device:

using said telephone capability of the programmable data processing device to automatically complete a telephone communication via said telephone line with a predetermined computer at a predetermined telephone number,

receiving at the predetermined computer the Calling Number Identification of the telephone line to which the programmable data processing device is connected,

determining at the predetermined computer by means of said Calling Number Identification, information specific to the general location of the telephone line derived from the Calling Number Identification,

transmitting from the predetermined computer to the programmable data processing device the determined information specific to the general location of the telephone line to the data processing device, and

using the determined information within the programmable data processing device to program the programmable data processing device.

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**4,942,600**

**COMMUNICATION APPARATUS FOR GENERATING A CALL SIGNAL FROM A TELEPHONE SET TO A DATA TERMINAL**

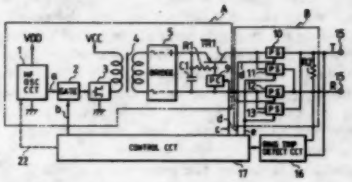
**Shoji Suzuki, Atsugi, Japan, assignor to Canon Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 6, 1989, Ser. No. 319,053**

**Claims priority, application Japan, Mar. 7, 1988, 63-053172; Mar. 15, 1988, 63-059246; Jun. 20, 1988, 63-150197**

**Int. Cl.[5] H04M *11/08***

**U.S. Cl. 379—100** **22 Claims**




1. A call signal generating circuit comprising:

a DC/DC converter;

ON/OFF control means for ON/OFF-controlling an output voltage from said DC/DC converter; and

polarity switching means for switching polarities of an ON/-OFF-controlled voltage.

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**4,942,601**

**METHOD OF MAKING A CALL RESERVATION AND SENDING AN INTERRUPT TONE IN A PRIVATE BRANCH EXCHANGE (PBX)**

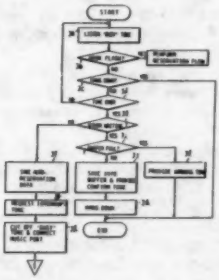
**Jae-Woon Park, Anyang, Rep. of Korea, assignor to Samsung Electronics Co., Ltd., Kyung Ki-Do, Rep. of Korea**

**Filed Jun. 30, 1989, Ser. No. 373,569**

**Claims priority, application Rep. of Korea, Jun. 30, 1988, 1988-8028**

**Int. Cl.[5] H04M *3/48***

**U.S. Cl. 379—209** **1 Claim**




1. A method of making a call reservation with a subscriber of a subset who is engaged in a telephone conversation in a Private Branch Exchange, making an auto-reservation with the subscriber and sending interrupt tones, said method comprising the steps of:

(a) listening to 'busy' tone and sequentially deciding if or not 'hook flash' is performed, and thereafter if YES, steping a call reservation, or if NO, checking if or not the handset is

on-hook and a specified time period set according to the 'busy' tone is over, when a dialing is made to the subset engaged in the telephone conversation;

(b) checking if or not there are any other subscribers who are waiting with auto-reservations, when the time-over of the busy tone has occured in the said step (a);

(c) saving information on the subscriber with auto-reservation in the call buffer of said subscriber engaged in the telephone conversation and asking a main system for the interrupt tones, when there is no waiting for auto-reservation in said step (b);

(d) switching from the 'busy' tone of reception unit to a music port to provide a music to the subscriber with the auto-reservation and asking the main system for a certain time length and checking the same, following said step (c);

(e) checking if or not said subscriber engaged in the telephone conversation has hung up his handset, when the time set in said step (d) is over, and thereafter if YES, operating the ringer to send a ring to the subscriber who has hung up the handset and disconnecting the music and providing a call reply sound;

(f) checking if or not the subscriber with auto-reservation has given up his call before the set time in said step (d) is over, and asking the main system for cancellation of the interrupt tone;

(g) checking if or not the reservation buffer is full when there is no reservation waiting in said step (b), and thereafter if YES, sending a warning sound, or if NO, saving his and the counter party's information in the reservation buffer, sending a confirmation sound and waiting until the handset is on-hook;

(h) checking if or not the subscriber engaged in the telephone conversation has hung up after he heard the interrupt tone in said step (c), and thereafter if YES, turning it into a free state, and if NO, checking if or not the 'hook flash' has been performed;

(i) checking if or not the line is 'busy' when the 'hook flash' is performed in said step (h), and thereafter if YES, providing the subscriber engaged in the telephone conversation with the music and holding the current counter party, then giving said confirmation sound and switching the call buffer into the dialing state; and

(j) dialing a call link code depending on the dial state of the call buffer in said step (i), establishing a connection with the subscriber waiting with an auto-reservation to enable a telephone conversation between them.

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**4,942,602**

## COORDINATED TRANSFER OF VOICE AND INFORMATION THROUGH A NETWORK OF DIGITAL SWITCHES

**William T. Baker, Jr., Palo Alto; Charles M. Buffum, San Jose; Charles H. Jolissaint, Sunnyvale, and Gregg W. Kerlin, Los Gatos, all of Calif., assignors to International Business Machines Corporation, Armonk, N.Y.**

**Filed Jan. 6, 1989, Ser. No. 294,524**

**The portion of the term of this patent subsequent to Feb. 21, 2006, has been disclaimed.**

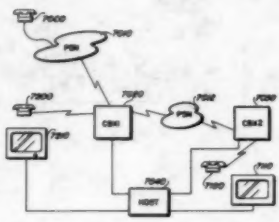
**Int. Cl.[5] H04M *3/58, 7/14***

**U.S. Cl. 379—212** **26 Claims**

1. A method of coordinating the transfer of a phone call and information associated with the phone call in a system having a plurality of phones managed by a plurality of digital switches communicating via network means, a plurality of display terminals, a host processor, and memory means for storing programs and data structures, the plurality of digital switches including memory means for storing programs and a data structure for uniquely identifying each phone by an extension, control means for selectively controlling interconnections of respective one of the plurality of phones, the host processor having memory means for storing a communication manager, data structures and application programs and communication means or communicating with the plurality of digital switches and the plurality of display terminals, said method comprising the steps of:

(a) sending the host processor a communication in response to a call transfer via the network means, said communication containing a source phone extension and a destination phone extension;

(b) receiving said communication by the communication manager of the host processor;



(c) processing said communication and determining an associated application program and an associated display terminal to link with said destination extension; and

(d) invoking said associated program to communicate via said associated display terminal to display information associated with said cell transfer.

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**4,942,603**

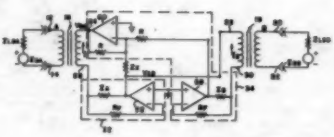
## METHODS AND APPARATUS FOR PROVIDING RECIPROCAL IMPEDANCE CONVERSION

**Charles W. Chambers, 1270 John Anderson Dr., Ormond Beach, Fla. 32074**

**Filed Nov. 4, 1987, Ser. No. 117,251**

**Int. Cl.[5] H04B *3/04***

**U.S. Cl. 379—398** **30 Claims**



1. An impedance conversion repeater for bidirectional communications from a switching equipment source generator having a switching equipment source impedance to a subscriber loop load impedance in a first direction, and from a subscriber loop source generator having a subscriber loop source impedance to a switching equipment load impedance in a second direction, comprising:

a switching equipment port for connection to switching equipment;

a subscriber loop port for connection to a cable comprising a portion of a subscriber loop;

first impedance conversion means coupled to the switching equipment port, for transmission of a switching equipment signal from the switching equipment port to the subscriber loop port in the first direction, and for controlling an input impedance of the subscriber loop part to be proportional to a reciprocal of a switching equipment load impedance connected to the switching equipment port;

second impedance conversion means coupled to the subscriber loop port, for transmission of a subscriber loop signal from the subscriber loop port to the switching equipment port in the second direction, and for controlling an input impedance of the switching equipment port to be proportional to a reciprocal of a subscriber loop load impedance connected to the subscriber loop port; and

negative impedance means connected to one of said ports for producing an effect upon bidirectional communications substantially similar to that produced by a series negative impedance connected in series with the switching equipment port.

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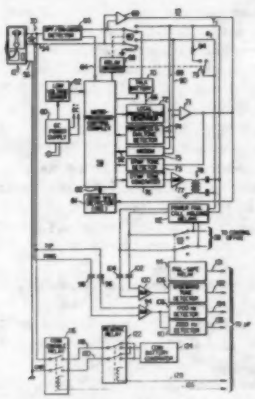
**4,942,604**

## LINE POWER CONTROL CIRCUIT FOR PAY STATION TELEPHONE

**Benjamin A. Smith, Celeste, and Conaway K. Hoback, Dallas, both of Tex., assignors to Digital Telecommunications Systems, Inc., Dallas, Tex.**

**Division of Ser. No. 912,984, Sep. 29, 1986, Pat. No. 4,777,647. This application Jun. 22, 1988, Ser. No. 210,071**
**Int. Cl.[5] H04M *19/00***
**U.S. Cl. 379—412** **26 Claims**



1. Apparatus adapted for use with a telephone system of the type supplying a loop current over a line to a telephone set comprising:

first switch means disposed in series with the line and switchable for providing continuity therethrough so that signals can be carried on the line to the telephone;

a source of power independent of the loop current for initially operating said first switch means to effect the carrying of telephone signals on the line; and

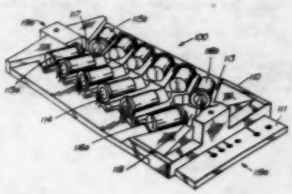
a second switch means operable for connecting the telephone to the line, and a control for controlling the operation of said second switch means, said control being responsive to the loop current on the telephone line for switching operation thereof so that when operated the telephone is connected to the line irrespective of the switched state of said first switched means, whereby when the telephone line continuity is initially established by the operation of said first switch means by said independent source of power, the telephone line continuity is not thereafter affected by the loss of said source of independent power.

**4,942,605**

## SECURITY HANDSET

**Donald T. McClain, Richardson, Tex., assignor to Northern Telecom Limited, Montreal, Canada**

**Continuation-in-part of Ser. No. 130,190, Dec. 8, 1987, Pat. No. 4,837,819. This application Oct. 28, 1988, Ser. No. 264,992**
**The portion of the term of this patent subsequent to Jun. 6, 2006, has been disclaimed.**
**Int. Cl.[5] H04M *1/19***
**U.S. Cl. 379—424** **26 Claims**



1. A security device for use with a telephone handset having microphone and ear transducers, adapted to prevent eavesdropping while the handset is in an on-hook position, comprising:

first switching means connected across said ear and microphone transducers;

second switching means connected in series with said ear and microphone transducers, such that when said handset is placed within a first predetermined orientation, corresponding to a secure mode, said first switching means becomes closed, shorting said ear and microphone transducers and said second switching means becomes open, and when said handset is placed within a second predetermined orientation, corresponding to an operating mode, said first switching means becomes open to enable said ear and microphone transducers, and said second switching means becomes closed; and

a mounting assembly for said first and second switching means comprised of a mounting block disposed on a circuit board.

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**4,942,606**

## COMPUTER WITH IMPROVED KEYBOARD PASSWORD FUNCTIONS

**Roger A. Kaiser; James H. Nuckols; Theodore F. Emerson, and Gary L. Brasher, all of Houston, Tex., assignors to Compaq Computer Corporation, Del.**

**Filed Feb. 7, 1989, Ser. No. 307,404**
**Int. Cl.[5] H04L *9/32***
**U.S. Cl. 380—4** **20 Claims**

1. A method of operating a computer system of the type having a CPU and memory associated therewith and a peripheral controller device coupled to said CPU, comprising the steps of:

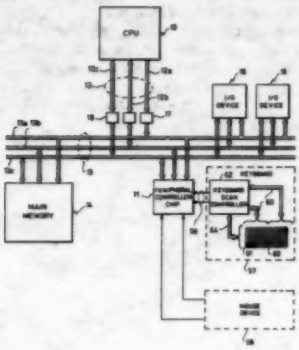
(a) switching said peripheral controller device between

(i) a normal operating mode wherein said peripheral controller device sends unsolicted information to said CPU and said CPU sends unsolicited information to said peripheral controller device without reference to password data, and

(ii) a lock-out mode wherein said peripheral controller device cannot send information to said CPU unless password data previously stored in said memory associated with said CPU is first entered to cause a switch back to said normal operating mode, but said CPU can send information to said peripheral controller device;

(b) monitoring unsolicited information transferred from said CPU to said peripheral controller device when said peripheral controller device is in said lock-out mode, and

selectively allowing only pre-selected information transferred to said peripheral controller device by said CPU to




activate said peripheral controller device for selected functions without switching from said lock-out mode.

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**4,942,607**

**METHOD OF TRANSMITTING AN AUDIO SIGNAL**

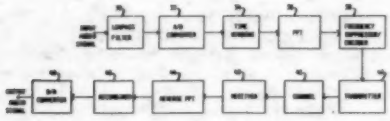
**Ernst Schröder, Hanover, and Walter Voessing, Wennigsen, both of Fed. Rep. of Germany, assignors to Deutsche Thomson-Brandt GmbH, Villingen-Schwenningen, Fed. Rep. of Germany**

**Filed Feb. 3, 1988, Ser. No. 152,026**

**Claims priority, application Fed. Rep. of Germany, Feb. 3, 1987, 3703143**

**Int. Cl.[5] G10L *3/02, 9/18;* H04B *1/66***

**U.S. Cl. 381—31** **24 Claims**



1. A method of transmitting an analog audio signal in digital form to be reconverted to analog form, comprising the steps of:

converting an analog audio signal to a first digital signal;

dividing the first digital signal in time segments;

converting divided portions of the first digital signal in the respective time segments into respective second digital signals representing the respective short-term spectrums of the time segments;

encoding the second digital signals for transmission while omitting from encoding portions of said second signals having signal levels which lie below given thresholds having values based on the psycho-acoustic law of masking, and such that the portions of the second signals having signal levels which are below the thresholds and are thus omitted, represent the frequency components of the short-term spectrum outside of at least one psycho-acoustically differentiable frequency range; and

transmitting the encoded second signals.

**4,942,608**

**PATTERN RECOGNITION APPARATUS USING A COMPOSITE SIMILARITY METHOD**

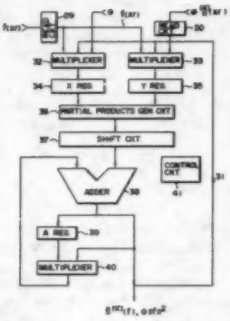
**Hiroshi Shigehara, Tokyo, Japan, assignor to Kabushiki Kaisha Toshiba, Kawasaki, Japan**

**Filed Feb. 22, 1988, Ser. No. 158,913**

**Claims priority, application Japan, Feb. 23, 1987, 62-39587**

**Int. Cl.[5] G10L *5/00***

**U.S. Cl. 381—43** **10 Claims**




1. A pattern recognition apparatus comprising:

reception means for receiving an input signal;

feature data extraction means, connected to said reception means, for extracting feature data from the input signal, the feature data being digital data and defining an input pattern vector f;

feature data storage means, connected to said feature data extraction means, for storing the feature data;

dictionary memory means for storing standard pattern data which defines predetermined standard pattern vectors $\phi$;

digital arithmetic circuit means, connected to said feature data storage means and said dictionary memory means, for performing calculations in accordance with a multiple similarity method; and

control/determination means for controlling an operation of said digital arithmetic circuit means and for recognizing and determining the input signal, based on the calculation result from said digital arithmetic circuit means and the multiple similarity method, wherein

said digital arithmetic circuit means comprises:

data bus means for transmitting data;

first data selection means, connected to said feature data storage means and said data bus means, for outputting one of the feature data and data on said data bus means;

second data selection circuit means, connected to said dictionary memory means, and said data bus means, for outputting one of the standard pattern data and data on said data bus means;

first register circuit means, connected to said first data selection means, for storing output data from said first data selection means;

second register circuit means, connected to said second data selection means, for storing output data from said second data selection means;

partial product generating circuit means, connected to said first and second register circuit means, for sequentially generating and outputting partial products of the storage data in said first register circuit means and said second register circuit means, in accordance with a predetermined multiplication method;

shift circuit means, connected to said partial product generating means, for shifting the partial products sequentially output from said partial product generating circuit means by a predetermined number of bits, according to the multi-

plication method, and sequentially outputting the shifted partial products;

a digital adder circuit means, connected to said shift circuit means, for performing addition between data sequentially output from said shift circuit means and other data, and outputting the addition results onto said data bus means;

third register circuit means, connected to said digital adder circuit means, for storing the output data from said digital adder circuit means; and

third data selection circuit means, connected to said digital adder circuit means and said third register circuit means, for selecting one of the output data from said digital adder circuit means and the storage data in said third register circuit means, and supplying the selected data to said digital adder circuit means as the other data and, wherein

said digital arithmetic circuit means performs at least a calculation of inner products of the input pattern vector (f(xr)) and the standard pattern vectors ($\phi^{(k)}$n(xr)) and a calculation of an accumulated value of squared values of the inner products;

said first data selection circuit means sequentially outputs vector components of the input pattern vector f, and said second data selection circuit means sequentially outputs vector components of the standard pattern vector $\phi$, during the calculation of the inner products, and said first and second selection circuit means respectively output the inner products supplied from said digital adder circuit means, when calculating the squared values of the inner products;

said partial product generating circuit means sequentially outputs partial products of vector components of the input pattern vector f and the standard pattern vector $\phi$ during the calculation of the inner products, and sequentially outputs the partial products of the inner products during the calculation of the squared values of the inner products; and

said third data selection circuit means supplies the output data from said digital adder circuit means as the other data to said digital adder circuit means, to accumulate the partial products during the calculation of the inner products, when the inner products are calculated, said third data selection circuit means supplies storage data of said third register circuit means as said other data to said digital adder circuit means, and, after a sum of data of said third data selection circuit means and a first partial product of squared values of the inner products is output from said digital adder circuit means, the output data of said digital adder circuit means is supplied as said other data, and said third register circuit means holds an accumulated value of the squared values of the inner products output from said digital adder circuit means.

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**4,942,609**

## ELECTRONIC FLYING INTEGRITY TESTER FOR DISK DRIVES

**Forrest C. Meyer, Minnetonka, Minn., assignor to Magnetic Peripherals Inc., Minnetonka, Minn.**

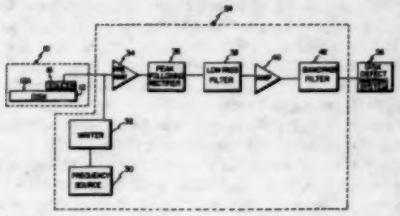
**Filed Mar. 15, 1989, Ser. No. 324,220**
**Int. Cl.[5] G11B *5/02, 27/36***
**U.S. Cl. 360—25** **5 Claims**

1. An apparatus for testing operation of a rotating memory drive which includes a rotatable memory medium for storing data and a read/write transducer which is spaced by an air bearing from a surface of the rotating memory medium during operation of the rotating memory drive and which writes data into the memory medium in response to a write signal and produces a playback signal as a function of data read from the memory medium, the apparatus comprising:

means for providing the write signal to cause the read/write transducer to write data into the memory medium at a predetermined frequency; and

means for deriving, from the read/write transducer playback signal, a test output signal which is representative of modulation frequencies of the playback signal due to air bearing disturbances comprising:

amplifier means for increasing amplitude of the playback signal from the read/write transducer; wherein the playback signal is composed of a higher frequency read data signal modulated by the lower frequency response of an air bearing disturbance signal;



demodulator means for separating the air bearing disturbance signal from the read data signal;

a low pass filter for separating out signals and noise having frequencies above expected frequencies of the air bearing disturbance signal; and

a bandpass filter for passing only signals having the frequencies in a range of a frequency response of the air bearing.

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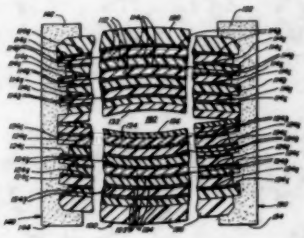
**4,942,610**

## CAPACITIVE STRUCTURE

**Charles C. Rayburn, 124 Sunset Ridge, Forest, Va. 24551**

**Filed Mar. 31, 1989, Ser. No. 331,148**
**Int. Cl.[5] H01G *1/14, 4/06***
**U.S. Cl. 361—309** **16 Claims**



1. A capacitive structure comprising an upper substructure and a lower substructure, each substructure comprising a plurality of capacitive layers laminated in stacked relation to one another, each capacitive layer having opposed first and second edges, each capacitive layer including a dielectric substrate and a metallized area, which covers a major portion of one surface of the dielectric substrate of such capacitive layer and which extends only to one of the first and second edges of such capacitive layer, the metallized areas on alternate ones of the capacitive layers in each substructure extending to opposite edges, the first edges of alternate ones of the capacitive layers in each such substructure extending beyond the first edges of the remainder of the capacitive layers in such substructure so as to form indentations along the first edges of such substructure, the second edges of alternate ones of the capacitive layers in each substructure extending beyond the second edges of the remainder of the capacitive layers of such substructure so as to form indentations along the second edges of such substructure, the capacitive structure further comprising at least one separating layer sandwiched between the upper and lower substructures, each such separating layer being made of a material

bonding less aggressively to at least one of the upper and lower substructures than the upper and lower substructures would bond to each other if each such separating layer were omitted, the capacitive structure further comprising a first mass of conductive material covering and extending into the indentations formed along the first edges of the capacitive layers of the upper and lower substructures, so as to provide electrical connections to and between the metallized areas extending to the first edges of the capacitive layers of the upper and lower substructures, and a second mass of conductive material covering and extending into the indentations formed along the second edges of the capacitive layers of the upper and lower substructures, so as to provide electrical connections to and between the metallized areas extending to the second edges of the capacitive layers of the upper and lower substructures, the masses of conductive material bonding the capacitive layers of each substructure to one another and bonding the upper and lower substructures to each other with the separating layer sandwiched between the upper and lower substructures, whereby, if the capacitive structure is exposed to thermal stresses tending to cause some of the capacitive layers to delaminate from one another, the separating layer tends to separate from at least one of the upper and lower substructures, thereby substantially to alleviate such stresses, before any of the capacitive layers delaminate from one another.

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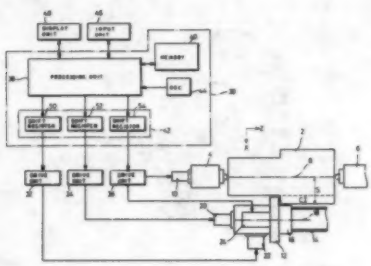
**4,942,611**

## METHOD OF CORRECTING MISALIGNMENT OF A WORKPIECE ON NUMERICALLY CONTROLLED MACHINE TOOL

**Takashi Kunugi, and Yoshinari Sasaki, both of Numazu, Japan, assignors to Toshiba Kikai Kabushiki Kaisha, Tokyo, Japan**

**Filed Jun. 24, 1988, Ser. No. 211,291**
**Claims priority, application Japan, Jun. 26, 1987, 62-160421**
**Int. Cl.[5] G06F *15/46*; G05B *19/18*; B24B *1/00***
**U.S. Cl. 364—474.06** **5 Claims**



1. A method of correcting the misalignment of a workpiece on a numerically controlled machine tool for machining the workpiece into a roll while rotating the workpiece at a prescribed speed, moving the tool back and forth radially thereof, and moving the tool axially thereof, said method comprising the steps of:

measuring the amount of misalignment of the axis of the workpiece and entering the measured amount as corrective data into a control system which stores numerical control data produced by successively programming amounts of radial movement of a tool depending upon axial positions of the tool;

calculating corrected values of at least one of the positional data of the tool in the axial direction and the data on the amount of movement of the tool in the radial direction, based on said corrective data; and

controlling said tool based on the calculated corrected values to machine the workpiece.

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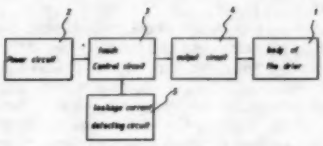
**4,942,612**

## LEAKAGE CURRENT PREVENTING MEANS FOR A DRIER

**Huck Wu, No. 46, Ho Hu, Lin Kou, Taipei, Taiwan**

**Filed Dec. 29, 1987, Ser. No. 138,978**
**Int. Cl.[5] H02H *3/16***
**U.S. Cl. 361—49** **6 Claims**



1. A drier having a leakage current preventing system comprising:

a power source means for providing a voltage from an AC source and including hot and ground wires,

an output circuit means for supplying said voltage to said dryer and including two TRIACs for permitting said voltage to pass to said output circuit means in response to a pulsed signal, one TRIAC being electrically connected to said hot wire and another TRIAC being electrically connected to said ground wire,

a touch control means for controlling said pulsed signal and including a touch control IC for providing said pulsed signal to said TRIACs in response to an actuating signal and a touch control terminal for providing said actuating signal to said touch IC; said TRIACs, touch control terminal and touch control IC being arranged so that when a user of the dryer touches said touch control terminal, said input signal is sent to said touch control IC and in response thereto said touch control IC provides said pulsed signal to said TRIACs, and

a leakage circuit detecting circuit means including a sensor means for detecting an impedance change in said dryer and actuation means for resetting said touch control IC in response to a detected impedance change by said sensor including an uni-junction transistor (PUT) arranged to receive said detected impedance change from said sensor and to provide said reset signal to said touch control IC, thereby ending said pulsed signal to said TRIACs and preventing supply of voltage to said output circuit and between said TRIACs.

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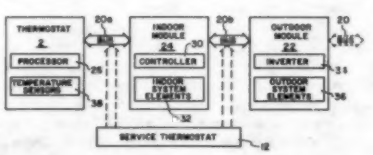
**4,942,613**

## SERVICE THERMOSTAT

**Gregory A. Lynch, Murfreesboro, Tenn., assignor to Heil-Quaker Corporation, Lavergne, Tenn.**

**Filed Dec. 2, 1988, Ser. No. 279,419**
**Int. Cl.[5] G05B *23/00***
**U.S. Cl. 364—557** **15 Claims**




1. A thermostat, adapted for use with a temperature control system having a communication bus and a means for storing predetermined bus addresses, said thermostat comprising:

switching means for selecting a desired one of a plurality of operating modes for said thermostat, said plurality of operating modes including a normal mode and a service mode;

processing means coupled to said switching means, said processing means selectively affects one of said operating modes, based on the position of said switching means;

bus interface means coupled to said processing means and said communication bus, said bus interface means communicating signals over said communication bus;

said processing means adapted to communicate bus address signals via said bus interface means, using a bus address signal determined by the current state of said switching means.

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**4,942,614**

## CALIBRATION OF ULTRASONIC TRANSDUCERS

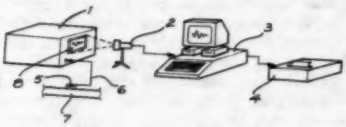
**Norman Hamilton, Cremorne, Australia, assignor to Australian Atomic Energy Commission, Lucas Heights, Australia**

**Filed Apr. 7, 1987, Ser. No. 35,441**

**Claims priority, application Australia, Apr. 16, 1986, PH05496**

**Int. Cl.[5] G01D** *18/00*; **G01R** *23/00*

**U.S. Cl. 364—571.01** **10 Claims**



1. Ultrasonic test apparatus comprising an ultrasonic test device of the type which includes a display to display output traces, a digitising camera for scanning and digitizing an output resulting from a test object which is displayed on the ultrasonic test device as a trace which is representative of a received signal of an ultrasonic transducer and its variation with respect to time, a digital computer adapted to receive a digital output signal of the digitising camera and to process said digital output by sampling said digital output representing said signal trace at discrete points with respect to time to determine information on the frequency characterisation of the ultrasonic test device, the frequency characterisation including a frequency spectrum, the digital computer having output means to output information representative of said frequency characterisation.

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**4,942,615**

## GATE PROCESSOR ARRANGEMENT FOR SIMULATION PROCESSOR SYSTEM

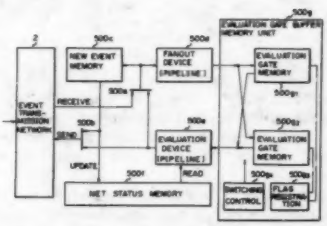
**Fumiyasu Hirose, Machida, Japan, assignor to Fujitsu Limited, Kawasaki, Japan**

**Filed Feb. 19, 1988, Ser. No. 157,958**

**Claims priority, application Japan, Feb. 20, 1987, 62-037318**

**Int. Cl.[5] G06F** *9/44*; **G01R** *31/28*

**U.S. Cl. 364—578** **5 Claims**




1. A gate processor arrangement for a logic simulation processor system including a control processor providing timing signals, input and output processors, and an event transmission network, said gate processor system comprising:

a logic network including logic elements divided into sections for receiving input data and outputting connection information;

a new event buffer memory, corresponding to said logic network, for storing an event at a timing t from the control processor for a predetermined one of said logic elements in one of the sections of said logic network;

a fan-out device, coupled to said new event buffer memory, for holding connection information for said one of said predetermined logic elements in said logic network and reading the data of said predetermined one of said logic elements preceding the timing t, the input data of said predetermined one of said logic elements being changed at a timing "t+1";

an evaluation gate buffer memory, coupled to said fan-out device, having a plurality of evaluation gate memory portions connectable to said fan-out device;

a net status memory, coupled to the logic network and said new event buffer memory, for holding net status information corresponding to input data and output data of a predetermined one of said logic elements in said logic network; and

an evaluation device, operatively connected to said evaluation gate buffer memory and said net status memory, responsive to the output of said evaluation gate buffer memory for reading the data in said net status memory, generating information for a change of the logic network status at a timing "t+1", and supplying the generated information to one of the event transmission network and said new event buffer.

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**4,942,616**

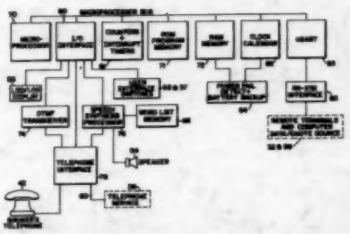
## INTERACTIVE SYNTHESIZED SPEECH QUOTATION SYSTEM FOR BROKERS

**Thomas Linstroth, 2305 Argonne Dr. NE., Minneapolis, Minn. 55421; Michael A. Franey, 4213 Xerxes Ave. S., Minneapolis, Minn. 55410, and George C. Idzorek, 1175 Iris #34, Los Alamos, N. Mex. 87544**

**Filed Sep. 9, 1985, Ser. No. 774,052**

**Int. Cl.[5] G10L** *5/02*; **G06F** *15/20*; **H04M** *11/00*

**U.S. Cl. 381—51** **32 Claims**



1. A system for use by a broker at a broker's workstation in his or her office to assist in quoting the prices of tradable instruments such as securities or commodities to customers, said prices available from a data link to an exchange where the tradable instruments are traded, said system comprising:

an outside telephone line servicing said office;

desk telephone handset means at said workstation;

quote retrieval means connected to said data link for obtaining prices of tradable instruments traded on said exchange;

telephone interface means connected to said telephone line for answering calls on said telephone line and for converting incoming signals on said telephone line to digital codes, said incoming signals inputted on the remote end of said telephone line;

signal generating means connected to said telephone line

through said telephone interface means for generating communication signals on said telephone line;

indicator means located at said workstation and perceivable by said broker at said workstation for conveying information to said broker while said broker is at said workstation;

control means connected to receive said digital codes from said telephone interface means and for controlling said signal generating means, said indicator means and said quote retrieval means, whereby a caller can convey requests and information to said control means using said incoming signals, said control means including:

(i) price quoting means responsive to a particular sequence of said digital codes representing a request for a quote of the price of particular tradable instrument traded on said exchange for obtaining the price of said particular tradable instrument from said quote retrieval means and for causing said signal generating means to quote the requested tradable instrument price using said communication signals over said telephone line;

(ii) caller identifying means for obtaining the identification of a caller on said telephone line, said identification obtained from a sequence of said digital codes, and for causing an identification of said caller to be indicated by said indicator means so that it is perceivable by said broker while the caller is on said telephone line obtaining a quote of a price; and

(iii) switching means operable by said broker from said broker's workstation for selectively connecting said telephone line to said desk telephone handset means whereby a broker can interrupt a call from a caller and speak with the caller in person.

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**4,942,617**

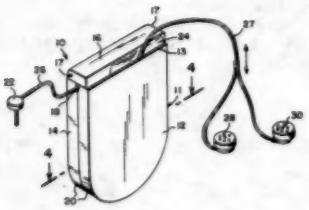
## EARPHONE CORD TAKE-UP DEVICE

**Mark Boylan, 55 Elm St., Hicksville, N.Y. 11801**

**Filed Dec. 22, 1988, Ser. No. 288,775**

**Int. Cl.[5] H04M** *1/05;* **H04R** *1/02, 1/06, 1/10*

**U.S. Cl. 381—182** **1 Claim**



1. An earphone cord take-up device which comprises:

(a) a hollow casing having an open top, said casing having a tapered notch formed on one side at the open top thereof so that said cord with said jack can exit therefrom, said casing being divided into a rear portion and a front portion both of which having a curved bottom wall;

(b) a cover pivotally mounted to the open top of said casing, said cover having a passageway formed on front so that said cord with said earphones can exit therethrough;

(c) means for attaching said casing to a belt of a person, said attaching means include a spring clip affixed to rear of said casing that can snap onto the belt;

(d) a pair of elongated cords electrically connected to each other within said casing and each extending outwardly from the open top of said casing;

(e) a jack connected to one of said cords;

(f) a pair of earphones connected to other of said cords;

(g) means for rotatably holding said cord with said earphones within said casing so that said cord with said earphones can be extended therefrom, said rotatably holding means includes a curved inner wall formed within said front portion of said casing in conjunction with said curved bottom wall of said casing thus forming a cylindrical chamber therein, said curved inner wall having a channel extending to said earphone rests, and a spindle formed into said rear portion of said casing and being transversely positioned within said casing with respect to the open top thereof, said spindle having a slot at free end and a key carried on other end thereof, a circular plate carrying a plurality of contact fingers thereon which are electrically connected to said cord with said jack, said plate having a central hole and a keyway so that the central hole can be placed onto said spindle with said keyway engaging with the key to prevent said plate from rotating, a spool cap carrying a plurality of concentric contact rings thereon which are electrically connected to said cord with said earphones, said spool cap having a central hole so that the central hole can be placed onto said spindle allowing said spool cap to rotate thereon with the contact rings making electrical contact with the contact fingers, a flat spiral spring having an inner end and an outer end, said inner end held within the slot in said spindle, a spool base having a central hole and a reinforced wall with a slot therein, the central hole of said spool base can be placed onto said spindle so that the outer end of said spring can be held within the slot within the wall of said spool base, while said spool cap can snap onto the wall of said spool base so that said cord from said earphones can enter the channel in the front portion of said casing and wrap around the wall of said spool base; and

(h) a pair of earphone rests formed within said front portion of said casing so that when said cover is opened and said cord with said earphones are in a retracted position said earphones will be held within said earphone rests.

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**4,942,618**

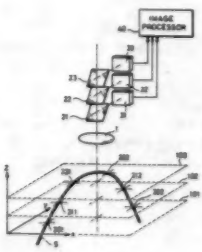
## METHOD AND APPARATUS FOR DETERMINING THE SHAPE OF WIRE OR LIKE ARTICLE

**Kazuhiko Sumi; Manabu Hashimoto; Yoshikazu Saksue; Kazuo Aita; Masahiro Sasakura, and Yutaka Ozaki, all of Amagasaki, Japan, assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan**

**Filed Mar. 16, 1989, Ser. No. 324,185**

**Int. Cl.[5] G06K** *9/00*

**U.S. Cl. 382—8** **2 Claims**




1. A method for determining the shape of a wire or like article positioned in a space, comprising the steps of:

splitting light from the article through an objective lens disposed to face said article into a plurality of optical paths;

deriving an image of said article by each of a plurality of image pickup devices which are disposed in the respective ones of said optical paths, said plurality of image pickup means being disposed at different distances from said objective lens and having their focal planes located in different positions;

processing the thus derived images of said article by means

of image processing means to thereby measure the contrast and the width of the image of said article;

detecting the intersections of said article with said focal planes and also measuring distances of various points of said articles from said focal points; and

interconnecting said intersections and said points of said article to thereby determine the shape of said spatially disposed article.

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**4,942,619**

## PATTERN INSPECTING APPARATUS

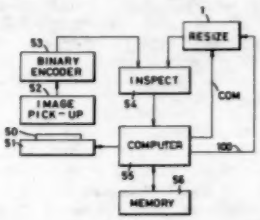
**Makoto Takagi, Kawasaki; Norio Fujii, Urawa, and Yoshihiko Fujimori, Tokyo, all of Japan, assignors to Nikon Corporation, Tokyo, Japan**

**Continuation of Ser. No. 3,245, Jan. 14, 1987, abandoned. This application Dec. 23, 1988, Ser. No. 289,428**

**Claims priority, application Japan, Jan. 20, 1986, 61-10675; May 23, 1986, 61-118831**

**Int. Cl.[5] G06K 9/42**

**U.S. Cl. 382—47** **5 Claims**




1. A pattern inspection apparatus for inspecting a pattern formed on a substrate on the basis of design information, the pattern on the substrate having dimensional tolerances with respect to size of the pattern represented by said design information, comprising:

means for picking up a pattern formed on the basis of design information and generating image data corresponding to a local area of the pattern;

means for extracting reference information required for forming a pattern within the local area from the design information, the reference information being expressed by logic levels of pixels corresponding to the pattern within the local area;

template means for receiving the reference information and detecting that a predetermined logic level is present at a predetermined position when a pixel logic level distribution is applied to the local area;

resizing means for combining additional information represented by a logic level corresponding to said dimensional tolerances to the pixel at the predetermined position of the reference information in response to said template means so that the size of the pattern represented by said reference information may be coincident with the size of the pattern on the substrate;

said resizing means shifting one edge of a pair of edges determining a width in a predetermined direction of the local area pattern represented by said reference information by an amount corresponding to an odd number times the pixel size and shifting the other edge of said pair of edges by an amount corresponding to zero or an even number times the pixel size; and

means for comparing the resized reference information with the image data.

**4,942,620**

## HIGH TEMPERATURE SENSOR FOR INDUCED VIBRATION DYNAMIC TOUCH SENSOR SYSTEM

**Gale E. Nevill, Jr., Gainesville, Fla., assignor to University of Florida, Gainesville, Fla.**

**Filed May 31, 1988, Ser. No. 199,686**

**Int. Cl.[5] G06K 9/00; B25J 13/08**

**U.S. Cl. 382—58** **19 Claims**

1. Sensor apparatus comprising:

pad means having a lower surface for contacting a surface of an object;

means for producing sliding contact between said lower surface of said pad means and an object;

means for mechanically coupling said pad means to a transducer means and for spacing said pad means from said transducer means at a predetermined distance, said mechanical coupling means comprising an elongated, substantially straight member connected to said transducer means near an upper end and connected to said pad means at a lower end;

said pad means and said elongated straight member being made of material capable of withstanding temperatures substantially above room temperature;

said transducer means for sensing vibrations and for producing an electrical signal corresponding to the vibrations;

means for deriving from the electrical signal a pattern characteristic of the object; and

wherein vibrations induced in said pad means during said sliding contact with said object are transmitted to said transducer means by said mechanical coupling means.

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**4,942,621**

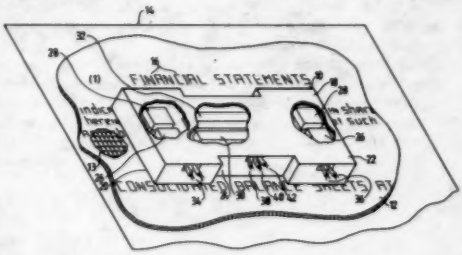
## METHOD FOR MAPPING SCANNED PIXEL DATA

**George T. Angwin, Palo Alto, Calif., assignor to MSC Technologies, Inc., Fremont, Calif.**

**Filed Nov. 15, 1988, Ser. No. 271,453**

**Int. Cl.[5] G06K 9/22**

**U.S. Cl. 382—59** **20 Claims**




1. A method for using a scanner to scan pixel data from an image on a page and map said scanned pixel data into a memory of a computer having memory addresses corresponding to discrete X-Y coordinate positions of said page, said scanner having an elongated detector array including detector ele-

ments 0 through N−1 for detecting pixel data from said page and communicating said pixel data to said computer, a first position sensor separated a first predetermined distance from detector element 0 for detecting and communicating first position information to said computer, and a second position sensor separated a second predetermined distance from said first position sensor for detecting and communicating second position information to said computer, comprising the steps of:

(a) placing said scanner over said page;

(b) commencing detection of said first and second position information by said first and second position sensors and communicating said first and second position information to said computer;

(c) determining the orientation of said scanner with respect to said coordinate positions using said first and second position information;

(d) moving said scanner to a selected first position on said page from which it is desired to commence scanning;

(e) commencing pixel data detection by said detector elements;

(f) moving said scanner over the image to be scanned;

(g) communicating said pixel data output by said detector elements to said computer; and

(h) using said first and second position information to determine memory addresses for storing said pixel data, each said memory address corresponding to a discrete X-Y coordinate position on said page, the pixel data output by a particular detector element, being stored at a memory address corresponding to a coordinate position which is nearest the position of said particular detector element.

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**4,942,622**

**MOBILE RADIO-RECEIVER SYSTEM WITH IMPROVED REPRODUCTION CHARACTERISTICS OF RECEPTION SIGNAL HAVING NOISE SUPERIMPOSED THEREON**

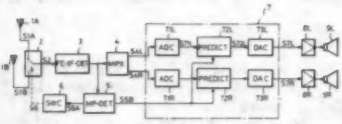
**Kazuo Takayama, Kobe, and Hidefumi Fuse, Nagoya, both of Japan, assignors to Fujitsu Ten Limited, Hyogo and Toyota Jidosha Kabushiki Kaisha, Aichi, both of, Japan**

**Filed Jul. 13, 1988, Ser. No. 218,231**

**Claims priority, application Japan, Jul. 16, 1987, 62-175944**

**Int. Cl.[5] H04B *7/08***

**U.S. Cl. 455—278** **14 Claims**



1. A mobile radio-receiver system comprising:

a pair of antennas installed on a mobile body and spaced at a predetermined distance;

a switching circuit operatively connected to said pair of antennas to receive two different radio-reception signals therefrom which are based upon a same transmission signal and selecting one of said radio-reception signals in response to a switching signal;

detection means, operatively connected to said switching circuit, for detecting said selected signal from therefrom,

noise detection means, operatively connected to said detection means, for detecting noise superimposed on said signal detected at said detection means, and outputting a noise detection signal;

antenna switching control means, operatively connected between said noise detection means and said switching circuit, for outputting said switching signal to said switching circuit in response to said noise detection signal; and

digital signal correction means, operatively connected to said detection means, and including an analog-to-digital converting means, for converting the data from said detection means in an analog form into a digital value, digital-type signal prediction means, for digitally predicting data converted at said analog-to-digital converting means, and digital-to-analog converting means for converting data from said digital-type signal prediction means into data in an analog form, said digital-type signal prediction means being operated in synchronization with a sampling time of said analog-to-digital converting means, and said digital-to-analog converting means being operated in synchronization with the operation of said signal prediction means, for digitally correcting data from said detection means when said noise detection signal indicates the existence of noise, or for outputting said data from said detection means when said noise detection signal does not indicate the existence of noise.

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**4,942,623**

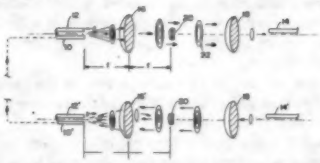
**DEVICE AND METHOD FOR MODAL SEPARATION AND COMBINATION IN AN OPTICAL FIBER INTRUSION DETECTION SYSTEM**

**Charles K. Asawa, Pacific Palisades; Shi-Kay Yao, Anaheim, and John D. Anderson, Manhattan Beach, all of Calif., assignors to TRW Inc., Redondo Beach, Calif.**

**Continuation of Ser. No. 507,422, Jun. 16, 1983, abandoned. This application Feb. 4, 1987, Ser. No. 11,400**

**Int. Cl.[5] G03B *5/14*; H04B *9/00***

**U.S. Cl. 455—612** **25 Claims**



1. For use in a bimodal intrusion detection system for optical fiber communications, apparatus for launching two separate information-carrying light beams into an optical output fiber, said apparatus comprising:

first and second sources of light for launching a monitor signal as higher-order modes and a data signal as lower-order modes, respectively, in an output fiber;

lens means for focusing light from said first and second sources of light onto an end of the output fiber; and

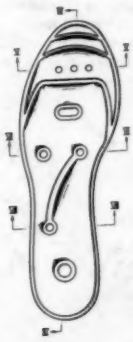
spatial modal filter means disposed coaxially with said lens means, for constraining light from said first source of light to impinge on the output fiber at angles of incidence exceeding a predetermined threshold angle.

# DESIGNS

JULY 17, 1990

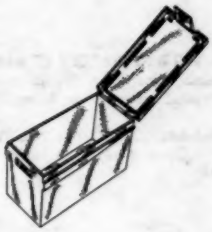
309,210
SNACK CHIP
John C. Seyfert, 514 Riley Dr., Fort Wayne, Ind. 46825
Filed Apr. 14, 1987, Ser. No. 38,527
Term of patent 14 years
U.S. Cl. D1—128

309,211
INSOLE OR THE LIKE
Masahiko Nakagawa, 20-16, Oyamadai 2-chome, Setagaya-ku, Tokyo, Japan
Filed Jul. 13, 1988, Ser. No. 218,301
Term of patent 14 years
U.S. Cl. D2—318

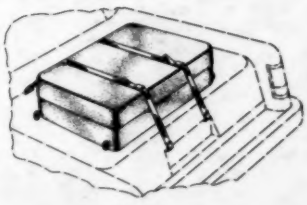


309,212
NECKTIE
Jerry Maletsky, 93 Windstone Dr., San Rafael, Calif. 94903, and LiFong Liu, Oakland, Calif., assignors to Jerry Maletsky, San Rafael, Calif.
Filed Jun. 8, 1987, Ser. No. 59,271
Term of patent 14 years
U.S. Cl. D2—602

309,213
ENCLOSED CONTAINER
Arlen L. Chaney, Lewiston, Id., assignor to Blount, Inc., Portland, Oreg.
Filed Nov. 20, 1986, Ser. No. 933,066
Term of patent 14 years
U.S. Cl. D3—35

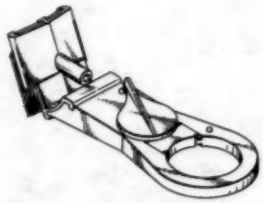


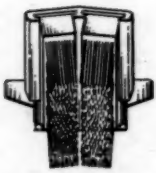
309,214
LUGGAGE CONTAINER VEHICLE ACCESSORY
Richard M. Haugland, 520 W. Gleneagles Dr., Phoenix, Ariz. 85023
Filed Nov. 13, 1987, Ser. No. 124,117
Term of patent 14 years
U.S. Cl. D3—40



309,215
MOBILE LUGGAGE CASE
Lai Wei-Mu, No. 31-1, Sec. 1, Wan Ho Rd., Nan Tun District, Taichung, Taiwan
Filed Jul. 8, 1986, Ser. No. 883,514
Term of patent 14 years
U.S. Cl. D3—76

309,216
BICYCLE SPROCKET CLEANER
John F. Hoenselaar, Anacortes, Wash., and Eivind Clausen, Bellingham, Wash., assignors to Allsop, Inc., Bellingham, Wash.
Filed Aug. 22, 1987, Ser. No. 53,423
Term of patent 14 years
U.S. Cl. D4—114



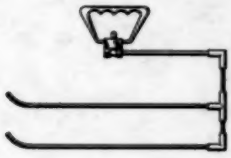


309,217
COMBINED COMPACT BRUSH AND COMB
Ming-Long Her, 24, Alley 3, Lane 42, Sec. 2, Hsiang Shang Road, Taichung, Taiwan
Filed Apr. 28, 1988, Ser. No. 187,400
Term of patent 14 years
U.S. Cl. D4—116

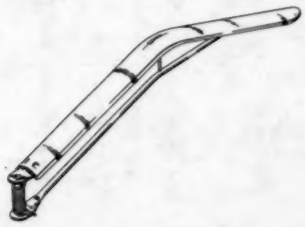
309,218
PACKAGED UNIT FOR BRUSHES
John T. Rueb, St. Paul, and Mark D. Sorlien, White Bear Lake, both of Minn., assignors to Minnesota Mining and Manufacturing Company, Saint Paul, Minn.
Filed May 8, 1987, Ser. No. 47,713
Term of patent 14 years
U.S. Cl. D4—135

309,219
CAP HOLDER
Robert C. Hasslocher, San Antonio, Tex., assignor to Capstik Products, Inc., San Antonio, Tex.
Filed Jul. 21, 1988, Ser. No. 222,715
Term of patent 14 years
U.S. Cl. D6—316

309,220
COMBINED CARRIER AND HANGER FOR FIREMAN'S GEAR
Eugene T. Welch, 38 Stratford Rd., Tinton Falls, N.J. 07724
Filed Feb. 9, 1987, Ser. No. 12,675
Term of patent 14 years
U.S. Cl. D6—317

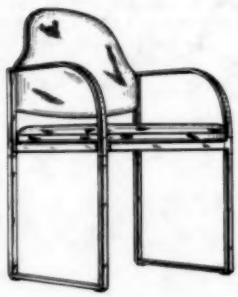


309,221
ARM FOR A HANGER UNIT
Par-Stephan Blom, and Lars-Arne Blom, both of Flasta, Sweden, assignors to Scanflex Medical AB, Taby, Sweden
Division of Ser. No. 32,395, Mar. 30, 1987, Pat. No. D. 302,359.
This application Apr. 21, 1989, Ser. No. 341,660
Term of patent 14 years
U.S. Cl. D6—328

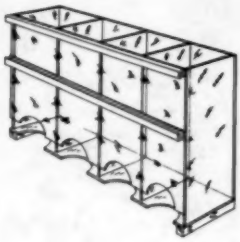


309,222
CHAIR
Karl Lübke, Rheda-Wiedenbrück, Fed. Rep. of Germany, assignor to Lübke Möbelwerke GmbH & Co. KG., Rheda-Wiedenbrück, Fed. Rep. of Germany
Filed Mar. 16, 1987, Ser. No. 26,523
Claims priority, application Fed. Rep. of Germany, Sep. 16, 1986, 2007
Term of patent 14 years
U.S. Cl. D6—366

309,223
CHAIR
Karl Lübke, Rheda-Wiedenbrück, Fed. Rep. of Germany, assignor to Lübke Möbelwerke GmbH & Co. KG., Rheda-Wiedenbrück, Fed. Rep. of Germany
Filed Mar. 16, 1987, Ser. No. 26,521
Claims priority, application Fed. Rep. of Germany, Sep. 16, 1986, 2007
Term of patent 14 years
U.S. Cl. D6—373



309,224
PRODUCT DISPENSER
Howard Rabin, Knox County, Tenn., assignor to Star Sales of Knoxville, Inc., Knoxville, Tenn.
Filed May 11, 1987, Ser. No. 47,458
Term of patent 14 years
U.S. Cl. D6—408

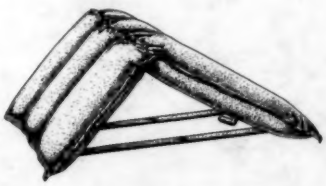


309,225
COMBINED SHOWER CADDY AND MIRROR
Richard S. Scarbro, 7307 Corum Ridge, Converse, Tex. 78109
Filed Mar. 28, 1988, Ser. No. 174,029
Term of patent 14 years
U.S. Cl. D6—525

309,226
BASEBALL EQUIPMENT HOLDER
Charles D. Wilcox, 545 E. Pine St., Fort Bragg, Calif. 95437
Filed Jun. 24, 1988, Ser. No. 210,772
Term of patent 14 years
U.S. Cl. D6—552

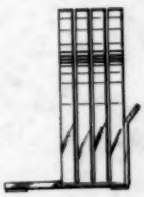
309,227
POCKETED SEAT BACKREST COVER
Louis Popiolkowski, 249 Parker St., Houston, Pa. 15342
Filed Oct. 8, 1986, Ser. No. 904,234
Term of patent 14 years
U.S. Cl. D6—601

309,228
INFLATABLE BOLSTER
Diarmid McVicar, 114 West First Avenue, Box 878, Qualicum Beach, British Columbia, Canada (V0R 2T0)
Filed Dec. 14, 1987, Ser. No. 132,142
Claims priority, application Canada, Jun. 16, 1987, 16-06-87-1
Term of patent 14 years
U.S. Cl. D6—604



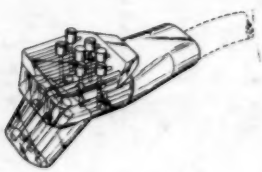
309,229
LOUNGE CHAIR COVER
Michael J. Cass, 193 Middlesex St., Springfield, Mass. 01109
Filed Feb. 8, 1988, Ser. No. 153,800
Term of patent 14 years
U.S. Cl. D6—610

309,230
SLICING GUIDE
Hubert F. Mulherin, Edmunston, Canada, assignor to Business Accounting Computer Services Ltd., Edmundston, Canada
Filed Dec. 29, 1987, Ser. No. 139,336
Claims priority, application Canada, Oct. 7, 1987, 07-10-87-6
Term of patent 14 years
U.S. Cl. D7—673



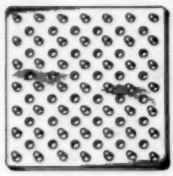
309,231
COMBINED WATER DISPENSER AND CONTAINER
Raymond L. Larson, Fargo, N. Dak., assignor to BMR Investments, Inc., Fargo, N. Dak.
Filed Mar. 2, 1987, Ser. No. 20,648
Term of patent 14 years
U.S. Cl. D7—313

309,232
BEVERAGE DISPENSING HEAD
Mojtaba Valiyee, Moraga; William A. Martindale, and Richard A. Martindale, both of Vacaville, all of Calif., assignors to Automatic Bar Controls, Inc., Vacaville, Calif.
Filed Oct. 20, 1986, Ser. No. 922,985
Term of patent 14 years
U.S. Cl. D7—398

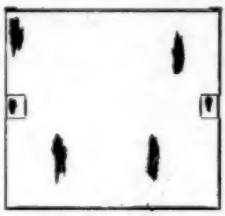


309,233
CAP FOR A GAS BURNER
Lyle B. Lund, Geneva, Ill., assignor to Harper-Wyman Company, Lisle, Ill.
Filed Jan. 22, 1988, Ser. No. 146,797
Term of patent 14 years
U.S. Cl. D7—407

309,234
COOKING PAD
Jack D. Howell, 3415 Linden Ave., Apt. #311, Long Beach, Calif. 90807
Filed Sep. 10, 1986, Ser. No. 905,644
Term of patent 14 years
U.S. Cl. D7—409



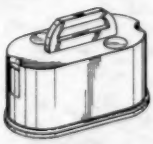
309,235
BARBEQUE ATTACHMENT GRID FOR COOKING SEAFOOD
John D. Griffard, Rte. 1, Box 264, Mackinaw, Ill. 61755
Filed Jun. 15, 1987, Ser. No. 61,403
Term of patent 14 years
U.S. Cl. D7—409



309,236
SPOON
Shiu C. Cheng, No. 16-3, Lane 34, Kinmen Street, Taipei, Taiwan
Filed Oct. 9, 1987, Ser. No. 106,334
Term of patent 14 years
U.S. Cl. D7—647

309,237
VACUUM BOTTLE
Ikuo Kobayashi, and Nobuyuki Kitamura, both of Kyoto, Japan, assignors to Japan Oxygen Co., Ltd., Tokyo, Japan
Filed Aug. 24, 1987, Ser. No. 88,970
Term of patent 14 years
U.S. Cl. D7—605

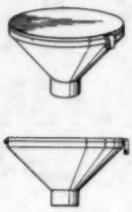
309,238
COMBINED BEVERAGE COOLER AND DISPENSER
Leonard H. Lipman, Humble, Tex., assignor to Falcor Group Inc.
Filed Dec. 12, 1988, Ser. No. 283,758
Term of patent 14 years
U.S. Cl. D7—605



309,239
PICNIC COOLER
Robert R. Deines, and William J. Steffes, both of Wichita, Kans., assignors to Coleman Outdoor Products, Inc., Wichita, Kans.
Filed Nov. 13, 1987, Ser. No. 120,010
Term of patent 14 years
U.S. Cl. D7—605

309,240
CONDIMENT GRINDER
Anthony H. Griffin, Lower Froyle, England, assignor to Cole & Mason Limited, Hampshire, England
Filed Apr. 20, 1987, Ser. No. 40,329
Claims priority, application United Kingdom, Oct. 24, 1986, 1037602
Term of patent 14 years
U.S. Cl. D7—679

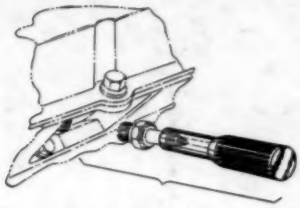
309,241
RECLOSABLE FUNNEL FIXTURE
Luay Ayyoubi, P.O. Box 8616, The Woodlands, Tex. 77387, and Travis O. Evans, 901 Sunnyside, Houston, Tex. 77076
Filed Jun. 6, 1988, Ser. No. 203,376
Term of patent 14 years
U.S. Cl. D7—700



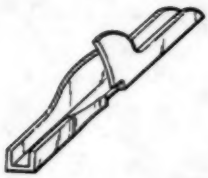
309,242
GROUND AERATOR
Joseph W. Laslo, 14648 93 Avenue, Edmonton, Alberta, Canada (T5R 5G6)
Filed Jun. 6, 1988, Ser. No. 141,466
Term of patent 14 years
U.S. Cl. D8—6

309,243
GARDENER'S TROWEL
E. Hubbard Yonkers, 13 Cooney St., Somerville, Mass. 02143
Filed Oct. 28, 1988, Ser. No. 264,171
Term of patent 14 years
U.S. Cl. D8—10

309,244
SPARK PLUG INSERTER/REMOVER
Michael Reed, 13749 Harold St., Taylor, Mich. 48180
Filed Jul. 27, 1987, Ser. No. 78,489
Term of patent 14 years
U.S. Cl. D8—14

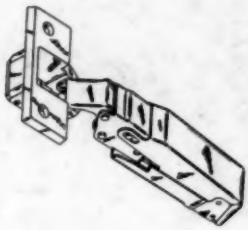


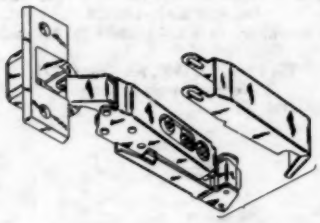
309,245
CAN OPENER
Fernando S. Salvador, 29, Tiburcio Anitua Str., Eibar (Guipuzoa), Spain (20600)
Filed Aug. 9, 1988, Ser. No. 230,117
Claims priority, application Spain, Feb. 9, 1988, 115089
Term of patent 14 years
U.S. Cl. D8—41



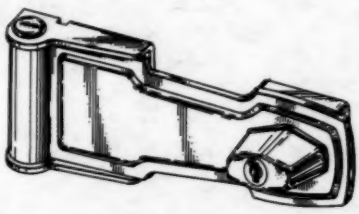
309,246
SCREWDRIVER
Steven S. Cascio, Kenosha; Donald J. Caldwell, Milwaukee; Tom S. Severson; Steven R. Wente, both of Kenosha, and Mark S. Bakula, Muskego, all of Wis., assignors to Snap-on Tools Corporation, Kenosha, Wis.
Filed Dec. 24, 1986, Ser. No. 942,521
Term of patent 14 years
U.S. Cl. D8—82

309,247
**HINGE WITH PROTECTIVE COVER THEREFOR**
Alfred Grass, Hochst/Vlbg., Austria, assignor to Alfred Grass GES.m.b.H. Metallwarenfabrik, Hochst/Vlgb., Austria
Filed Nov. 19, 1987, Ser. No. 122,889
Claims priority, application Fed. Rep. of Germany, Jun. 27, 1987, URA 867/87
Term of patent 14 years
U.S. Cl. D8—323

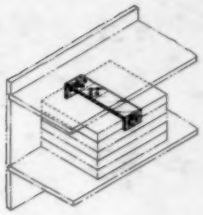




309,248
**HASP-TYPE LATCH**
Walter J. MacFarlane, Kensington, Conn., assignor to The Stanley Works, New Britain, Conn.
Filed Dec. 22, 1988, Ser. No. 288,801
Term of patent 14 years
U.S. Cl. D8—338

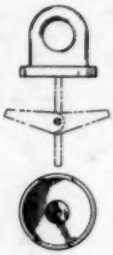


309,249
**PRODUCT DISPLAY MOUNTING BRACKET FOR PROVIDING PRICE TAGS OR CODED INVENTORY LABELS**
Joseph Crowley, 9639 Wystone Ave., Northridge, Calif. 91324
Filed Dec. 23, 1986, Ser. No. 946,280
Term of patent 14 years
U.S. Cl. D8—354

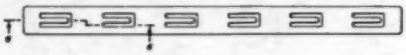


309,250
**BI-DIRECTIONAL LASHING PATCH**
David T. Flood, Elk Grove Village, and Mark J. Udelhofen, Park Ridge, both of Ill., assignors to Illinois Tools Works Inc., Glenview, Ill.
Filed Feb. 20, 1987, Ser. No. 17,434
Term of patent 14 years
U.S. Cl. D8—356

309,251
TIE DOWN EYELET
Gerald E. Palmer, New Baltimore, Mich., assignor to Gerald E. Palmer Enterprises, New Baltimore, Mich.
Filed Aug. 14, 1987, Ser. No. 85,334
Term of patent 14 years
U.S. Cl. D8—367

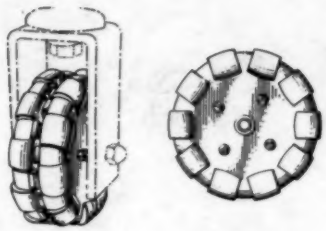


309,252
CLIP STRIP FOR DISPLAYING BAGGED PRODUCTS
Joseph Crowley, 9639 Wystone Ave., Northridge, Calif. 91324
Filed Dec. 23, 1986, Ser. No. 946,277
Term of patent 14 years
U.S. Cl. D8—373



309,253
SEAT BRACKET HOLDER FOR SELF-CONTAINED BREATHING CYLINDER
Richard J. Doebler, N55 W14298 Carol Dr., Menomonee Falls, Wis. 53051
Filed Jun. 26, 1987, Ser. No. 66,644
Term of patent 14 years
U.S. Cl. D8—373

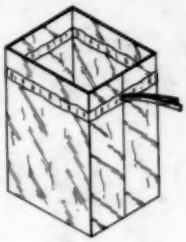
309,254
ROLLER WHEEL
Henry B. O. Guile, Botany, Australia, assignor to Oscar Investments Pty. Limited, New South Wales, Australia
Filed Aug. 5, 1987, Ser. No. 81,893
Claims priority, application Australia, Jun. 25, 1987, 2217/87
Term of patent 14 years
U.S. Cl. D8—375



309,255
DETACHABLE FLASHLIGHT MOUNT FOR FIREARMS OR SIMILAR ARTICLE
Harold E. Karow, Jr., 1115 E. Manitoba St., Milwaukee, Wis. 53207
Filed Feb. 12, 1987, Ser. No. 13,722
Term of patent 14 years
U.S. Cl. D8—395

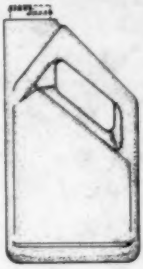
309,256
LIQUID DISPENSER
George F. W. Boesel, Canton, Mass., assignor to Autocrat, Inc., Lincoln, R.I.
Filed Aug. 26, 1987, Ser. No. 89,624
Term of patent 14 years
U.S. Cl. D9—300

309,257
GIFT SACK
Marion P. Myers, Rte. 2, Box 386, Purcellville, Va. 22132
Filed Jun. 8, 1987, Ser. No. 59,395
The portion of the term of this patent subsequent to Jul. 26, 2002, has been disclaimed.
Term of patent 14 years
U.S. Cl. D9—305



309,258
BEVERAGE TRAY
Henry R. Vigue, Waterville, Me., assignor to Keyes Fibre, Waterville, Me.
Filed Jun. 5, 1987, Ser. No. 58,536
Term of patent 14 years
U.S. Cl. D9—341

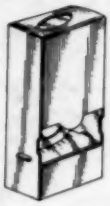
309,259
CONTAINER BODY FOR LIQUIDS OR THE LIKE
Susan W. S. Chemler, Naperville, Ill., assignor to Continental Plastic Containers, Inc., Norwalk, Conn.
Filed Jul. 1, 1988, Ser. No. 214,620
Term of patent 14 years
U.S. Cl. D9—376



309,260
BOTTLE
George R. Conrad, Dunwoody, Ga., assignor to General Electric Company, Mt. Vernon, Ind.
Filed Oct. 28, 1987, Ser. No. 114,265
Term of patent 14 years
U.S. Cl. D9—378

309,261
JAR
Richard L. Weckman, Perrysburg, Ohio, assignor to Owens-Illinois Glass Container Inc., Toledo, Ohio
Filed Oct. 13, 1987, Ser. No. 107,729
Term of patent 14 years
U.S. Cl. D9—398

309,262
DISPLAY CARTON
Charles B. Coiner, Rte. 2, Box 4157, Berryville, Va. 22611
Filed Jun. 16, 1988, Ser. No. 207,441
Term of patent 14 years
U.S. Cl. D9—418



309,263
COMBINED SHIPPING AND DISPLAY CONTAINER FOR SUNGLASSES OR THE LIKE
Aaron M. Markovitz, Rochester, N.Y., assignor to Bausch & Lomb Incorporated, Rochester, N.Y.
Filed Sep. 14, 1987, Ser. No. 96,427
Term of patent 14 years
U.S. Cl. D9—432

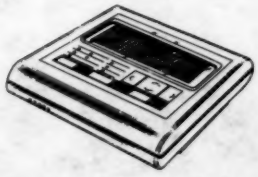
309,264
LID FOR OVENABLE TRAY
Hampton E. Forbes, Jr., Newark, Del., assignor to Westvaco Corporation, New York, N.Y.
Filed Sep. 10, 1987, Ser. No. 94,798
Term of patent 14 years
U.S. Cl. D9—438

309,265
BOTTLE CAP
Philippe Colonna, Chavenay, France, assignor to Cebal, Clichy, France
Filed Apr. 9, 1987, Ser. No. 36,241
Claims priority, application France, Oct. 10, 1986, 86 5313
Term of patent 14 years
U.S. Cl. D9—452

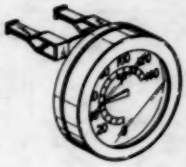
309,266
CLOCK
Ryoichi Kaneko, Tokyo, Japan, assignor to Seikosha Co., Ltd., Japan
Filed Jul. 6, 1987, Ser. No. 69,626
Claims priority, application Japan, Jan. 5, 1987, 62-25[U]
Term of patent 14 years
U.S. Cl. D10—6

309,267
WRISTWATCH
Hans Saurer, Viganello, Switzerland, assignor to Christian Dior, S.A., Paris, France
Filed May 14, 1987, Ser. No. 50,212
Term of patent 14 years
U.S. Cl. D10—39

309,268
CENTRAL THERMOSTAT
Seiji Wada; Nobuo Otsuka, both of Kamakura; Toyohiro Kobayashi, Shizuoka, all of Japan, and Peter Thompson, Cypress, Calif., assignors to Mitsubishi Denki Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 21, 1987, Ser. No. 98,680
Term of patent 14 years
U.S. Cl. D10—50



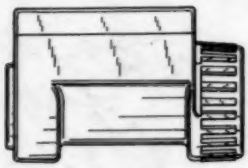
309,269
THERMOMETER FOR VEHICLES
Yoshihisa Tanaka, Ichikawa, Japan, assignor to 501 Tanaka Manufacturing Company Limited, Tokyo, Japan
Filed Mar. 11, 1987, Ser. No. 24,799
Claims priority, application Japan, Sep. 12, 1986, 61-35779
Term of patent 14 years
U.S. Cl. D10—57



309,270
THERMOMETER
Seiichi Uchiyama, Tokorozawa, Japan, assignor to Car Mate Manufacturing Company Limited, Tokyo, Japan
Filed Oct. 9, 1987, Ser. No. 107,524
Claims priority, application Japan, Apr. 17, 1987, 62-15072
Term of patent 14 years
U.S. Cl. D10—57

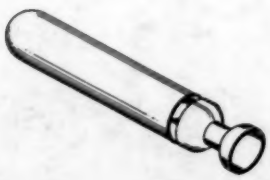
309,271
PROBE FOR ELECTRONIC CLINICAL THERMOMETER
Kenichi Kida, Tokyo, Japan, assignor to Terumo Kabushiki Kaisha, Tokyo, Japan
Filed Sep. 30, 1987, Ser. No. 103,260
Claims priority, application Japan, Jul. 31, 1987, 62-30900
Term of patent 14 years
U.S. Cl. D10—57

309,272
FLOW METER
Robert E. Hall, Wichita, Kans., assignor to Great Plains Industries, Inc., Wichita, Kans.
Filed Apr. 27, 1987, Ser. No. 43,232
Term of patent 14 years
U.S. Cl. D10—96

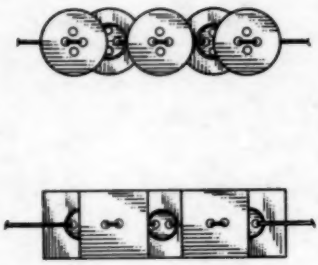


309,273
ROAD SAFETY DEVICE
Frank Myers, Alcester, and Roger L. Williams, Broxbourne, both of United Kingdom, assignors to APH Road Safety Ltd., Redditch, United Kingdom
Filed Jan. 11, 1988, Ser. No. 141,906
Term of patent 14 years
U.S. Cl. D10—113

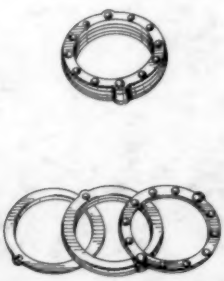
309,274
WHISTLE
Russell C. Gray, 600 S. Park Rose Ave., Monrovia, Calif. 91016
Filed Oct. 5, 1987, Ser. No. 104,096
Term of patent 14 years
U.S. Cl. D10—119



309,275
JEWELRY CHAIN
Marjorie K. Kouns, 15 Minetta St., New York, N.Y. 10012
Filed Jun. 29, 1987, Ser. No. 67,909
Term of patent 14 years
U.S. Cl. D11—11

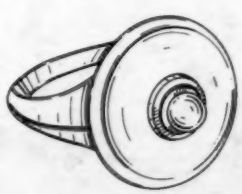


309,276
FINGER RING OR SIMILAR ARTICLE
Andre Mejias, Vevey, Switzerland, assignor to Premiere de Tabbah SA, Fribourg, Switzerland
Filed May 2, 1988, Ser. No. 189,595
Claims priority, application Int'l Pat. Institute, Nov. 25, 1987, DMA/000/699
Term of patent 14 years
U.S. Cl. D11—26



309,277
FINGER RING OR SIMILAR ARTICLE
Andre Mejias, Vevey, Switzerland, assignor to Premiere de Tabbah SA, Fribourg, Switzerland
Filed May 2, 1988, Ser. No. 189,603
Claims priority, application Int'l Pat. Institute, Nov. 25, 1987, DMA/000/699
Term of patent 14 years
U.S. Cl. D11—27

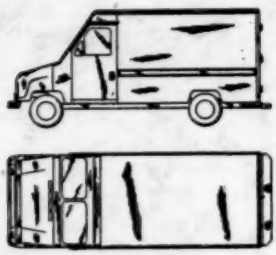
309,278
FINGER RING
André Méjias, Vevey, Switzerland, assignor to Premiere de Tabbah, S.A., Fribourg, Switzerland
Filed Jun. 20, 1988, Ser. No. 208,557
Claims priority, application Int'l Pat. Institute, Dec. 22, 1987, DMA/000/711
Term of patent 14 years
U.S. Cl. D11—35



309,279
COLUMN FOR A TROPHY
Raymond H. Pierce, Gravenhurst, Canada, assignor to Tromar Corporation Ltd., Mississauga, Canada
Division of Ser. No. 903,616, Sep. 3, 1986. This application Sep. 5, 1989, Ser. No. 402,592
Term of patent 14 years
U.S. Cl. D11—164

309,280
PACIFIER COUPLER FOR BABY'S GARMENT
Vicki Balfanz-Lee, 9102 NE. Highway 99, Vancouver, Wash. 98665
Filed Sep. 3, 1987, Ser. No. 93,552
Term of patent 14 years
U.S. Cl. D11—215

309,281
VAN
George J. Tistes, Elkhart; Donald J. Wilson, Granger, and Eugene A. Dylewski, II, Granger, all of Ind., assignors to Holiday Rambler Corporation, Wakarusa, Ind.
Filed Oct. 25, 1988, Ser. No. 262,481
Term of patent 14 years
U.S. Cl. D12—99

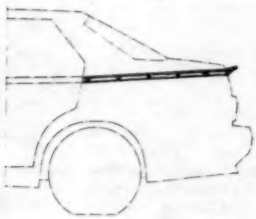


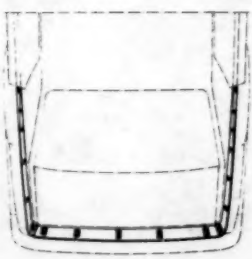
309,282
AUTOMOBILE TIRE
Yoshihiko Hasegawa, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Oct. 27, 1987, Ser. No. 113,271
Claims priority, application Japan, Apr. 27, 1987, 62-16845
Term of patent 14 years
U.S. Cl. D12—146

309,283
AUTOMOBILE TIRE
Yasuo Igarashi, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Oct. 13, 1987, Ser. No. 106,763
Claims priority, application Japan, Apr. 13, 1987, 62-14466
Term of patent 14 years
U.S. Cl. D12—148

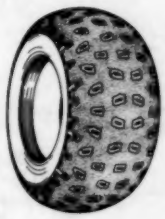
309,284
AUTOMOBILE TIRE
Akihito Monta, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Oct. 13, 1987, Ser. No. 106,762
Claims priority, application Japan, Apr. 13, 1987, 62-14468
Term of patent 14 years
U.S. Cl. D12—149

309,285
THREE PIECE SPOILER UNIT FOR ATTACHMENT TO THE REAR OF A VEHICLE
Carlo Giavazzi, Milan, Italy, assignor to Alfa Lancia Industriale S.r.l., Arese, Italy
Filed May 28, 1987, Ser. No. 55,114
Claims priority, application Italy, Nov. 28, 1986, 23884 B/86
Term of patent 14 years
U.S. Cl. D12—181



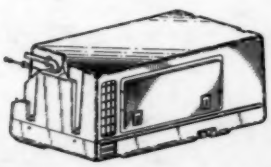


309,286
AUTOMOBILE TIRE
Yoshihiko Hasegawa, Hyogo, Japan, assignor to Sumitomo Rubber Industries, Ltd., Hyogo, Japan
Filed Oct. 27, 1987, Ser. No. 113,265
Claims priority, application Japan, Apr. 27, 1987, 62-16846
Term of patent 14 years
U.S. Cl. D12—149

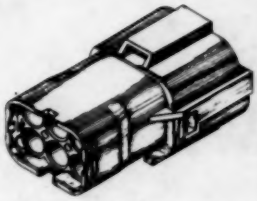


309,287
LEFT FRONT DOOR FOR AN AUTOMOBILE
Björn E. A. Envall, Vänersborg, Sweden, and Giorgetto Giugiaro, Troffarello, Italy, assignors to Saab-Scania Aktiebolag, Trollhattan, Sweden
Filed Apr. 24, 1984, Ser. No. 603,942
Claims priority, application Sweden, Oct. 26, 1983, 83-2778
Term of patent 14 years
U.S. Cl. D12—196

309,288
GENERATOR SET ENCLOSURE
Paul W. Haverly, Coon Rapids, Minn., assignor to Onan Co.poration, Minneapolis, Minn.
Filed Nov. 30, 1987, Ser. No. 126,956
Term of patent 14 years
U.S. Cl. D13—114



309,289
HOUSING FOR AN ELECTRICAL CONNECTOR
Takayoshi Endo; Sakai Yagi, and Satoshi Yamada, all of Gotenba, Japan, assignors to Yazaki Corp., Japan
Filed Oct. 13, 1987, Ser. No. 108,299
Term of patent 14 years
U.S. Cl. D13—147

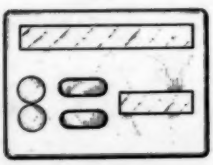


309,290
ELECTRIC SWITCH ENCLOSURE
Larry J. Newmark, Avon, and David A. Hibbert, South Windsor, both of Conn., assignors to General Electric Company, New York, N.Y.
Filed Mar. 16, 1987, Ser. No. 26,348
Term of patent 14 years
U.S. Cl. D13—169

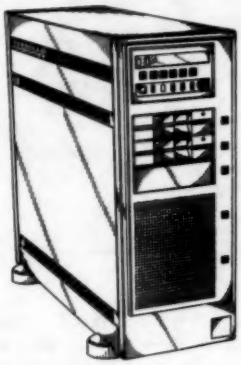
309,291
FLAT FUSE HOLDER
Richard F. Wharton, Glenview, Ill., assignor to Saflo Corporation, Chicago, Ill.
Filed Jan. 4, 1988, Ser. No. 140,592
Term of patent 14 years
U.S. Cl. D13—161

309,292
BLANK FACEPLATE UNIT FOR PRINTED CIRCUIT BOARD MODULE RACKS
Salvatore Sucato, Erie, Pa., assignor to Tegam, Inc., Madison, Ohio
Filed Jul. 28, 1988, Ser. No. 225,136
Term of patent 14 years
U.S. Cl. D13—184

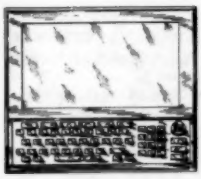
309,293
POCKET DATA INPUT/OUTPUT TERMINAL
Arthur L. Helbig, Jr., 3501 Upper Mill Ct., Ellicott City, Md. 21043
Filed Sep. 29, 1988, Ser. No. 250,502
Term of patent 14 years
U.S. Cl. D14—100



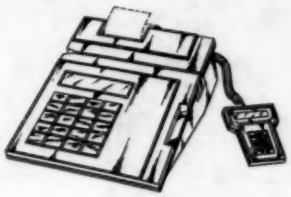
309,294
PERSONAL COMPUTER
Ettore Sottsass, Milano, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy
Filed Dec. 14, 1987, Ser. No. 132,137
Claims priority, application Italy, Jun. 22, 1987, 53453/87[U]
Term of patent 14 years
U.S. Cl. D14—100



309,295
DATA TERMINAL
Carlos de la Huerga, Shorewood; Todd N. Roberts, Germantown; Christopher J. Salimes, Brookfield, and John P. Tennessen, Milwaukee, all of Wis., assignors to Marquette Electronics, Inc., Milwaukee, Wis.
Filed Jan. 29, 1988, Ser. No. 150,322
Term of patent 14 years
U.S. Cl. D14—100

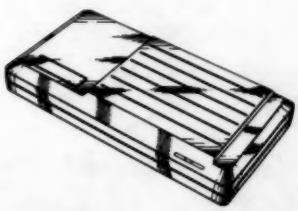


309,296
CREDIT CARD TERMINAL WITH AUXILIARY KEYBOARD
Robert Kohler, Paris, France, assignor to Societe D'Applications Generales D'Electricite, Paris, France
Filed Dec. 14, 1987, Ser. No. 132,143
Claims priority, application France, Jun. 25, 1987, 87 3784
Term of patent 14 years
U.S. Cl. D14—105



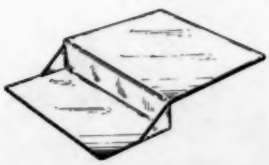
309,297
DATA PROCESSING TERMINAL FOR CREDIT CARD
Masami Suda, Tokyo, Japan, assignor to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Sep. 15, 1987, Ser. No. 96,401
Claims priority, application Japan, Aug. 31, 1987, 62-35194
Term of patent 14 years
U.S. Cl. D14—105

309,298
TELEPHONE DATA MODEM
Floyd J. Pushelberg, Ottawa, Canada, assignor to Northern Telecom Limited, Montreal, Canada
Filed Nov. 10, 1988, Ser. No. 269,847
Term of patent 14 years
U.S. Cl. D14—107



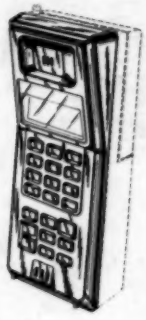
309,299
FLOPPY DISK DRIVE
Woo Y. Oh, Inchon, Rep. of Korea, assignor to Gold Star Co., Ltd., Seoul, Rep. of Korea
Filed Oct. 5, 1988, Ser. No. 254,292
Claims priority, application Rep. of Korea, Apr. 28, 1988, 5784/1988
Term of patent 14 years
U.S. Cl. D14—109

309,300
PORTABLE COMPUTER KEYBOARD SUPPORT
Everett L. Lindgren, Jr., 8000 W. 86th Street Cir., Bloomington, Minn. 55438
Filed Oct. 14, 1988, Ser. No. 258,319
Term of patent 14 years
U.S. Cl. D14—114

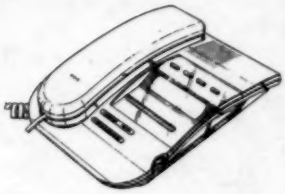


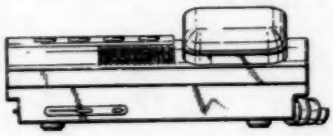
309,301
HOUSING FOR A PORTABLE CELLULAR HANDSET TELEPHONE OR SIMILAR ARTICLE
Leonid Sorea, Lincolnwood, and Albert L. Nagele, Wilmette, both of Ill., assignors to Motorola, Inc., Schaumburg, Ill.
Division of Ser. No. 334,001, Apr. 6, 1989, Pat. No. D. 306,163.
This application Oct. 12, 1989, Ser. No. 420,392
Term of patent 14 years
U.S. Cl. D14—138

309,302
FRONT COVER FOR CELLULAR PORTABLE TELEPHONE
Douglas M. Dickson, Lynchburg, Va., assignor to Ericsson GE Mobile Communications Inc., Lynchburg, Va.
Filed Dec. 5, 1988, Ser. No. 280,268
Term of patent 14 years
U.S. Cl. D14—138

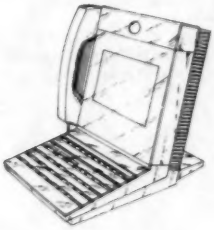


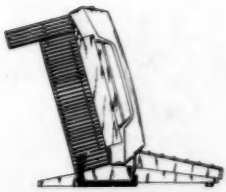
309,303
COMBINED CLOCK, RADIO, TELEPHONE
Paul Appleby, London, England, assignor to Dialatron Limited, Surrey, United Kingdom
Filed Jun. 28, 1989, Ser. No. 373,217
Term of patent 14 years
U.S. Cl. D14—144





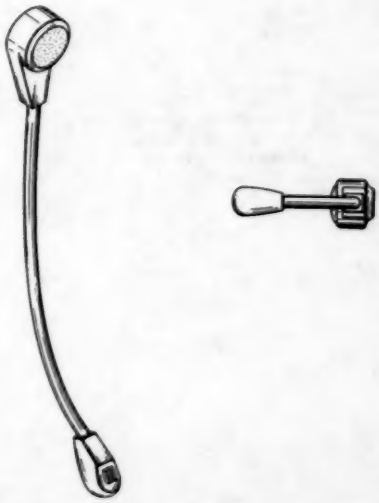
309,304
VIDEO COMMUNICATIONS TERMINAL, INCLUDING HOUSING, TELEPHONE HANDSET, KEYBOARD, CAMERA AND IMAGE SCREEN
Kazuhumi Takada, and Kazuhito Takai, both of Tokyo, Japan, assignors to Oki Electric Industry Co., Ltd., Tokyo, Japan
Filed Dec. 21, 1988, Ser. No. 287,084
Term of patent 14 years
U.S. Cl. D14—144



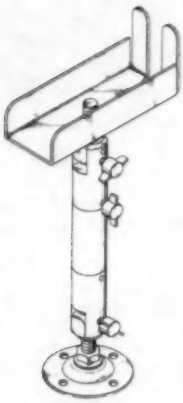


309,305
MICROPHONE
Rolf von Hall, 2575 Palisade Ave., Bronx, N.Y. 10463
Filed Mar. 10, 1988, Ser. No. 166,158
Term of patent 14 years
U.S. Cl. D14—225

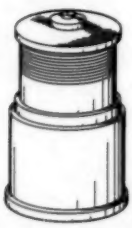
309,306
UNITARY TELEPHONE EAR RECEIVER ELEMENT AND ATTACHED MICROPHONE
Margaret A. Weiser, and Issac Weiser, both of 4760 Corbin Ave., Tarzana, Calif. 91356
Filed Mar. 13, 1989, Ser. No. 322,239
Term of patent 14 years
U.S. Cl. D14—249



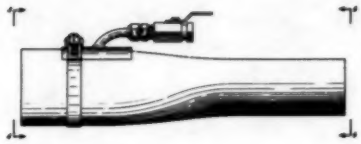
309,307
PEDESTAL FOR A MOBILE TELEPHONE OR SIMILAR ARTICLE
David M. Sigurdson, 8410 Prine, Magnolia, Tex. 77355
Filed Jun. 26, 1989, Ser. No. 371,018
Term of patent 14 years
U.S. Cl. D14—251



309,308
SUMP-RISER HOUSING
Michael C. Webb, 15 E. Uwchlan Ave., Exton, Pa. 19341
Filed Oct. 6, 1988, Ser. No. 254,129
Term of patent 14 years
U.S. Cl. D15—7

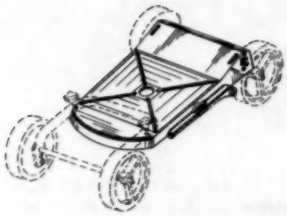


309,309
MIXING NOZZLE FOR A FIBER BLOWING AND SPRAYING MACHINE
Gregory S. Sundheim, Littleton, and John M. Sundheim, Denver, both of Colo., assignors to Enersaver Products, Inc., Denver, Colo.
Filed Dec. 22, 1988, Ser. No. 288,117
Term of patent 14 years
U.S. Cl. D15—13

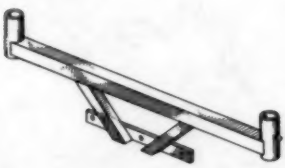


309,310
LAWN MOWER
Fusao Fushiya; Takashi Yamazaki; Katsuyasu Ito, and Matsuo Ohashi, all of Anjo, Japan, assignors to Makita Electric Works, Ltd., Anjo, Japan
Filed Sep. 11, 1987, Ser. No. 95,246
Claims priority, application Japan, Apr. 10, 1987, 62-14305
Term of patent 14 years
U.S. Cl. D15—14

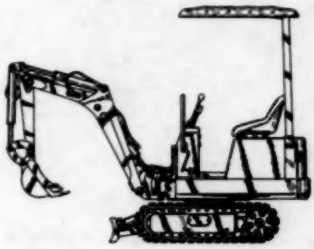
309,311
LAWN MOWER HOUSING OR THE LIKE
Dallas W. Jones, New Hartford; Lauren J. Young, Poland, both of N.Y., and Matthew F. Orr, Shawnee Mission, Kans., assignors to Trim-A-Lawn Corporation, Utica, N.Y.
Filed Nov. 23, 1988, Ser. No. 275,560
Term of patent 14 years
U.S. Cl. D15—17

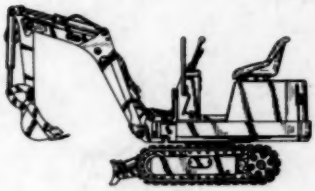


309,312
CASTER ARM FOR A MOWING MACHINE
Robert W. Hass, 14366 Azalea Rd., #74, Phelan, Calif. 92371
Filed Dec. 19, 1988, Ser. No. 285,946
Term of patent 14 years
U.S. Cl. D15—17

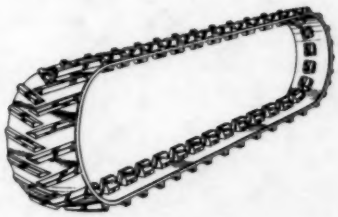


309,313
BACKHOE
Akira Takashima; Shizuo Shimoie, and Hisato Katoh, all of Sakai, Japan, assignors to Kubota, Ltd., Osaka, Japan
Filed Apr. 29, 1988, Ser. No. 187,996
Claims priority, application Japan, Oct. 29, 1987, 62-44276; Oct. 29, 1987, 62-44277
Term of patent 14 years
U.S. Cl. D15—25

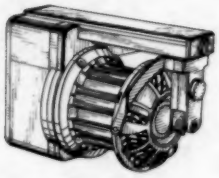




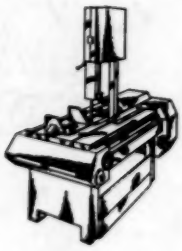
309,314
ENDLESS BELT FOR A BELTED VEHICLE
Charles E. Grawey; Robert J. Grob, and Cullen P. Hart, all of Peoria, Ill., assignors to Caterpillar Inc., Peoria, Ill.
Filed Feb. 20, 1987, Ser. No. 17,128
Term of patent 14 years
U.S. Cl. D15—28



309,315
YARN FEEDER FOR TEXTILE MACHINES
Bruno Maina, Valdengo, Italy, assignor to Roj Electrotex S.p.A., Biella, Italy
Filed Apr. 12, 1988, Ser. No. 180,828
Claims priority, application Italy, Oct. 12, 1987, 22525B/87
Term of patent 14 years
U.S. Cl. D15—78



309,316
BAND SAW
Scott J. Collins; Timothy B. Strandell, and John W. Van Akkeren, all of Milwaukee, Wis., assignors to Armstrong-Blum Mfg. Co., Oshkosh, Wis.
Filed Feb. 26, 1988, Ser. No. 160,509
Term of patent 14 years
U.S. Cl. D15—134

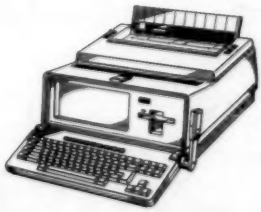


309,317
BALL END MILL
Osamu Tsujimura, Kawasaki; Tatsuo Arai, Kitamoto, and Masayuki Okawa, Kawasaki, all of Japan, assignors to Mitsubishi Kinzoku Kabushiki Kaisha, Tokyo, Japan
Filed Apr. 13, 1988, Ser. No. 181,153
Claims priority, application Japan, Oct. 15, 1987, 62-42120
Term of patent 14 years
U.S. Cl. D15—139

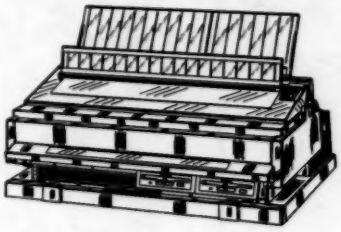
309,318
ACTIVE EYE WEAR
Leonard Bordonaro, 14 Stephen Ave., Englewood Cliffs, N.J. 07632, and Jerome Salsky, 16 Crest Rd., Emerson, N.J. 07630
Filed Apr. 21, 1989, Ser. No. 341,659
Term of patent 14 years
U.S. Cl. D16—112

309,319
HEADLESS TAMBOURINE
Michael Greenspoon, 10 Hamayan Street, Givatayim, Israel
Filed Jan. 19, 1988, Ser. No. 146,148
Term of patent 14 years
U.S. Cl. D17—22

309,320
WORD PROCESSOR
Michifumi Ishigami, Nagoya, Japan, assignor to Brother Kogyo Kabushiki Kaisha, Nagoya, Japan
Filed May 19, 1987, Ser. No. 52,351
Claims priority, application Japan, Dec. 5, 1986, 61-48405
Term of patent 14 years
U.S. Cl. D18—1

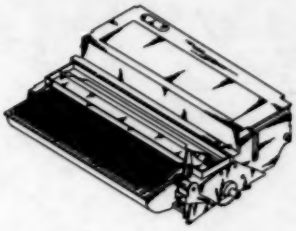


309,321
PRINTER FOR TYPEWRITER
Mario Bellini, Milan, Italy, assignor to Ing. C. Olivetti & C., S.p.A., Ivrea, Italy
Filed Aug. 13, 1987, Ser. No. 85,007
Claims priority, application Italy, Feb. 18, 1987, 53032/87[U]
Term of patent 14 years
U.S. Cl. D18—13



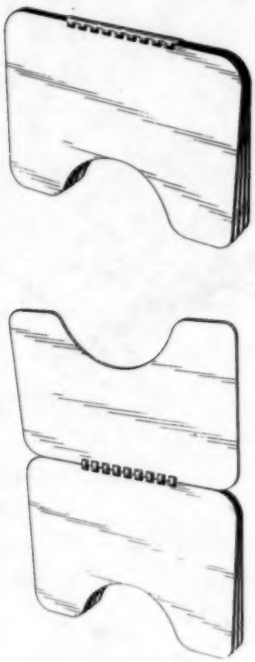
309,322
EDITING DEVICE FOR COPYING MACHINE
Tomohiko Hirata, Kawasaki, and Yosuke Ohsawa, Tokyo, both of Japan, assignors to Canon Kabushiki Kaisha, Tokyo, Japan
Filed Nov. 10, 1988, Ser. No. 269,560
Claims priority, application Japan, May 13, 1988, 63-18791
Term of patent 14 years
U.S. Cl. D18—40

309,323
CARTRIDGE FOR AN ELECTROPHOTOGRAPHIC PRINTER
James A. Craft, Lexington; William D. Freeman, Harrodsburg; James J. Molloy, Lexington; David T. Shadwick, Lexington; Thomas G. Twardeck, Lexington, and James P. Wang, Lexington, all of Ky., assignors to International Business Machines Corporation, Armonk, N.Y.
Filed Feb. 6, 1989, Ser. No. 306,435
Term of patent 14 years
U.S. Cl. D18—40

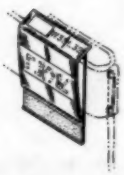


309,324
BOOK
Jean D. Callaghan, 1332 59th Pl., LaGrange, Ill. 60525
Filed Oct. 30, 1987, Ser. No. 114,393
Term of patent 14 years
U.S. Cl. D19—26

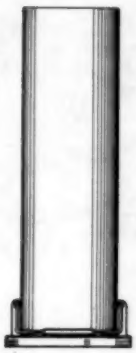
309,325
KIT FOR TEACHING COLOR COORDINATION
Christine Halls, 2 Keele Street, Ste. 303, Toronto, Ontario, Canada (M6P 4C1)
Filed Nov. 6, 1987, Ser. No. 118,335
Term of patent 14 years
U.S. Cl. D19—62



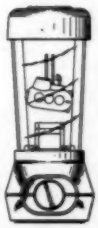
309,326
DISPLAY CLIP FOR ATTACHMENT TO THE WAISTBAND OF TROUSERS FOR DISPLAYING SIZE OF GARMENT AND OTHER INFORMATION
Jay M. Friedman, New York, N.Y., assignor to Palm Beach Incorporated, Cincinnati, Ohio
Filed Sep. 24, 1986, Ser. No. 911,315
Term of patent 14 years
U.S. Cl. D20—43



309,327
GAME BALL PROJECTOR
Edwin H. Chapman, P.O. Box 265, West Union, W. Va. 26456
Filed Aug. 3, 1987, Ser. No. 80,579
Term of patent 14 years
U.S. Cl. D21—2



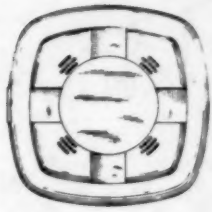
309,328
WATER GAME HOUSING
Mitsunori Noshiro, Tokyo, Japan, assignor to Tomy Company, Ltd., Tokyo, Japan
Filed Jan. 11, 1988, Ser. No. 141,886
Claims priority, application Japan, Jul. 20, 1987, 62-29379
Term of patent 14 years
U.S. Cl. D21—12

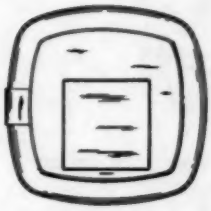


309,329
WATER GAME HOUSING
Makiko Watanabe, Tokyo, Japan, assignor to Tomy Company, Ltd., Tokyo, Japan
Filed Jan. 11, 1988, Ser. No. 141,903
Claims priority, application Japan, Jul. 28, 1987, 62-30586
Term of patent 14 years
U.S. Cl. D21—12

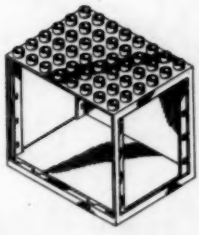
309,330
WATER GAME HOUSING
Makiko Watanabe, Tokyo, Japan, assignor to Tomy Company, Ltd., Tokyo, Japan
Filed Jan. 11, 1988, Ser. No. 141,905
Claims priority, application Japan, Jul. 16, 1987, 62-29078
Term of patent 14 years
U.S. Cl. D21—12

309,331
ELECTRONIC GAME HOUSING
Donny Leung, Tai Koo Shing, Hong Kong, assignor to Video Technology Industries, Inc., Wheeling, Ill.
Filed Oct. 14, 1987, Ser. No. 108,046
Term of patent 14 years
U.S. Cl. D21—13





309,332
TOY BUILDING ELEMENT
Flemming H. Olsen, Espergaerde, Denmark, assignor to Interlego A.G., Switzerland
Filed Nov. 29, 1988, Ser. No. 278,144
Term of patent 14 years
U.S. Cl. D21—108



309,333
SPACE ALIEN DOLL
Billy J. Foster, 3458 Petre Rd., Springfield, Ohio 45502
Filed Jan. 29, 1987, Ser. No. 12,045
Term of patent 14 years
U.S. Cl. D21—166

309,334
TALKING POLICE OFFICER FIGURE
Frank T. Italiano, Jr., 33 Birchwood Dr., North Arlington, N.J. 07032
Filed May 18, 1987, Ser. No. 51,149
Term of patent 14 years
U.S. Cl. D21—178

309,335
CYCLE EXERCISER
Lien C. Yang, 11F. No. 149, Roosevelt Rd. Sec. 3, Taipei, Taiwan
Filed Oct. 24, 1988, Ser. No. 261,466
Term of patent 14 years
U.S. Cl. D21—194

309,336
CYCLE EXERCISER
Lien C. Yang, 11F. No. 149, Roosevelt Rd. Sec. 3, Taipei, Taiwan
Filed Oct. 24, 1988, Ser. No. 261,467
Term of patent 14 years
U.S. Cl. D21—194

309,337
CYCLE EXERCISER
Lien C. Yang, 11F. No. 149, Roosevelt Rd., Sec. 3, Taipei, Taiwan
Filed Oct. 24, 1988, Ser. No. 261,468
Term of patent 14 years
U.S. Cl. D21—194

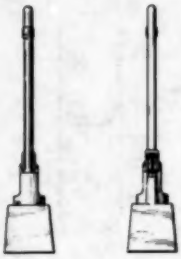
309,338
GOLF CLUB PUTTER HEAD
Albert Sopp, 1120 Bernalillo Pl., SE., Albuquerque, N. Mex. 87123
Filed Dec. 28, 1987, Ser. No. 138,013
Term of patent 14 years
U.S. Cl. D21—217

309,339
SOLID PROJECTILES
Eric A. Latty, 125 E. Missouri Ave., Phoenix, Ariz. 85012
Continuation-in-part of Ser. No. 140,385, Jan. 4, 1988. This application Dec. 12, 1988, Ser. No. 283,872
Term of patent 14 years
U.S. Cl. D22—116

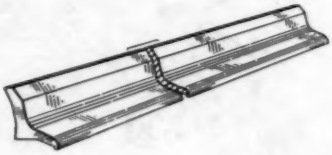
309,340
FISHING REEL
Yasuhisa Kameda, and Toshiaki Yoshikawa, both of Tokyo, Japan, assignors to Daiwa Seiko, Inc., Tokyo, Japan
Filed May 2, 1988, Ser. No. 189,604
Claims priority, application Japan, Nov. 9, 1987, 62-45708
Term of patent 14 years
U.S. Cl. D22—141

309,341
SPILL CONTAINMENT SYSTEM TROUGH UNIT WITH WEIR FLANGE
William T. Breadmont, Bakersfield, Calif., assignor to Roy F. Saunders and James P. Peel, both of Bakersfield, Calif., a part interest to each
Filed Feb. 4, 1987, Ser. No. 10,802
Term of patent 14 years
U.S. Cl. D23—200

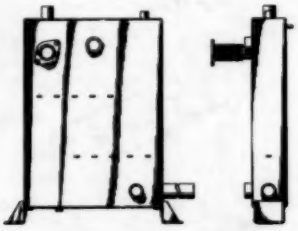
309,342
ELECTRONIC INDICATOR FAUCET
Duane D. Nowlin, New Brighton; John R. Nelson, West St. Paul, and Christopher M. Wilker, Circle Pines, all of Minn., assignors to Ecodyne Corporation, St. Paul, Minn.
Filed Aug. 8, 1986, Ser. No. 894,762
Term of patent 14 years
U.S. Cl. D23—239



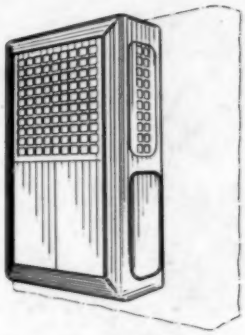
309,343
LOUVER GASKET
Coleman L. Koza, 321 Laclie St., Orillia, Ontario, Canada (L3V 4P2), and Lawrence J. Koza, 42 Cairns Boulevard, Barrie, Ontario, Canada (L4M 4S7)
Filed Apr. 12, 1988, Ser. No. 180,859
Term of patent 14 years
U.S. Cl. D23—269



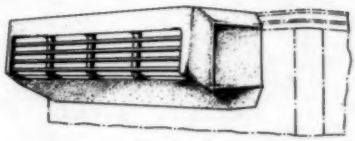
309,344
HEAT EXCHANGER
Herbert R. Ratch; Margo B. Ratch, and David E. Lumbert, all of 18171 Alice La., Huntington Beach, Calif. 92648
Filed Dec. 12, 1988, Ser. No. 283,514
Term of patent 14 years
U.S. Cl. D23—323



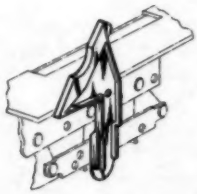
309,345
COVER FOR A TRANSPORT REFRIGERATION UNIT
Lowell M. Anderson, Bloomington; Ambrose Tao, Burnsville; Rodney H. Volk, Eden Prairie; Peter B. Allard, Minnetonka, all of Minn., and Clarence F. Graser, Venice, Fla., assignors to Thermo King Corporation, Minneapolis, Minn.
Filed Feb. 9, 1988, Ser. No. 154,671
Term of patent 14 years
U.S. Cl. D23—325



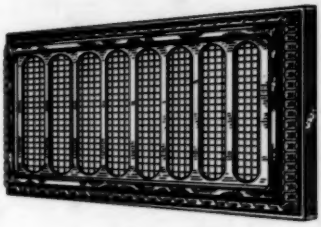
309,346
COVER FOR A TRANSPORT REFRIGERATION UNIT
Peter B. Allard, Minnetonka; Michael R. Weiss, Richfield, and David B. Ziegler, Eden Prairie, all of Minn., assignors to Thermo King Corporation, Minneapolis, Minn.
Filed Oct. 21, 1987, Ser. No. 110,987
Term of patent 14 years
U.S. Cl. D23—325



309,347
DAMPER LEVER
Douglas S. Brown, Knoxville, Tenn., assignor to American Metal Products Company, LaFollette, Tenn.
Filed Oct. 13, 1988, Ser. No. 257,492
Term of patent 14 years
U.S. Cl. D23—386



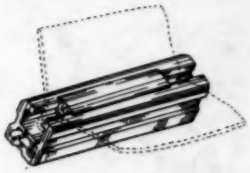
309,348
VENTILATOR GRILLE
Paul M. Sarazen, Jr., 214 Fairview Dr., and Dennis A. Beam, 410 Westfield Dr., both of Shelby, N.C. 28150
Filed Oct. 28, 1988, Ser. No. 264,506
Term of patent 14 years
U.S. Cl. D23—387



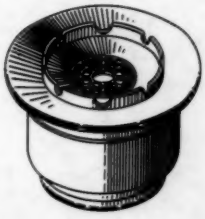
309,349
SAMPLING ADAPTER FOR CARBON DIOXIDE MONITORING IN A RESPIRATORY SYSTEM
Antti Martikainen, Vantaa, and Jorma Auvinen, Nummela, both of Finland, assignors to Instrumentarium Corp., Finland
Filed Nov. 9, 1987, Ser. No. 118,645
Claims priority, application Finland, May 21, 1987, 416/87
Term of patent 14 years
U.S. Cl. D24—17

309,350
SURGICAL STERNOTOMY BAND TIGHTENING INSTRUMENT
Lloyd A. Sutherland, Central Islip, and Alfred V. Vasconcellos, Edison, both of N.J., assignors to Pfizer Hospital Products Group, Inc., New York, N.Y.
Filed Jun. 1, 1987, Ser. No. 56,565
Term of patent 14 years
U.S. Cl. D24—26

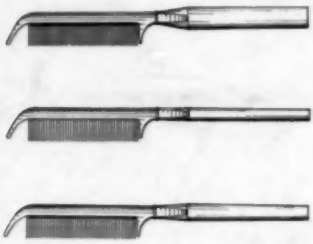
309,351
COMBINED FRAME EXTRUSION AND SPLINE FOR FRAMING AWNINGS
Glorio J. Patsy, Jr., 3560 Strawberry La., Cumming, Ga. 30130
Filed Jun. 5, 1989, Ser. No. 361,112
Term of patent 14 years
U.S. Cl. D25—119



309,352
ASHTRAY
William A. Harder, Shinglehouse, Pa., and Guy Cassaday, Riverside, R.I., assignors to Har-Col Enterprises, Inc., Olean, N.Y.
Filed Dec. 23, 1988, Ser. No. 289,579
Term of patent 14 years
U.S. Cl. D27—135



309,353
COMBINED COMB AND ROLLER
Photis Nicolaou, 13203 Canterbury, Sterling Heights, Mich. 48077
Filed Feb. 4, 1988, Ser. No. 152,061
Term of patent 14 years
U.S. Cl. D28—26



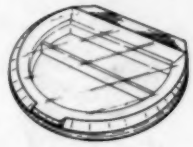
309,354
HAIR CRIMPING HEAD
Leandro P. Rizzuto, Greenwich, Conn.; Kit-Lun Leung, North Point, and Hou-On Lo, Kowloon, both of Hong Kong, assignors to Conair Corporation, Stamford, Conn.
Filed Jun. 13, 1988, Ser. No. 205,799
Term of patent 14 years
U.S. Cl. D28—35

309,355
RAZOR HANDLE
Jill M. Shurtleff, South Boston, Mass., assignor to The Gillette Company, Boston, Mass.
Filed Feb. 29, 1988, Ser. No. 161,665
Term of patent 14 years
U.S. Cl. D28—48

309,356
HAND REST
Joseph F. Johns, 735 SE. Malden, Portland, Oreg. 97202
Filed Feb. 1, 1988, Ser. No. 150,712
Term of patent 14 years
U.S. Cl. D28—56

309,357
DUAL COSMETIC CONTAINER
Marc A. Rosen, New York, N.Y., assignor to Conopco, Inc., New York, N.Y.
Filed Mar. 30, 1987, Ser. No. 32,195
Term of patent 14 years
U.S. Cl. D28—77

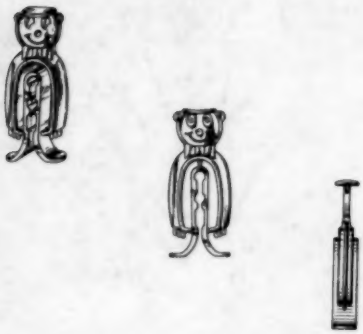
309,358
COSMETIC COMPACT
Reinhard Machelett, Meinerzhagen, and Dietrich Machelett, Zum Rothenstein, both of Fed. Rep. of Germany, assignors to Wilhelm Koopman KG, Meinerzhagen, Fed. Rep. of Germany
Filed Jun. 10, 1988, Ser. No. 206,332
Term of patent 14 years
U.S. Cl. D28—78



309,359
CHILD SAFETY HARNESS
Barry L. Joachim, 2116 65 Pl., Lubbock, Tex.
Filed Mar. 23, 1987, Ser. No. 28,925
Term of patent 14 years
U.S. Cl. D29—11

309,360
MITT
Shirley M. Torrence, 4231 Columbus, Bakersfield, Calif. 93306
Filed Feb. 27, 1987, Ser. No. 19,605
Term of patent 14 years
U.S. Cl. D29—22

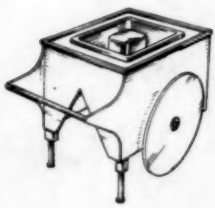
309,361
CLOTHESPIN
Robert C. Collyer, Unit 3C, Summerhouse Lane, Harefield, Middlesex, UB9 6HU, United Kingdom
Filed Nov. 6, 1987, Ser. No. 118,359
Claims priority, application United Kingdom, May 14, 1987, 1042173
Term of patent 14 years
U.S. Cl. D32—62



309,362
FLATIRON
Giuseppe Giannelli, Como, Italy, assignor to Micromax S.p.A., Como, Italy
Filed Sep. 1, 1988, Ser. No. 240,900
Claims priority, application Italy, Mar. 1, 1988, 20760/88[U]
Term of patent 14 years
U.S. Cl. D32—70

309,364
SALVAGE DRUM
Mark D. Shaw; J. Tad Heyman, and Laurence M. Bierce, all of Jacksonville, Fla., assignors to Essef Corporation, Chardon, Ohio
Filed Feb. 6, 1987, Ser. No. 11,721
Term of patent 14 years
U.S. Cl. D34—39

309,363
FLOWER CART
Edwin F. Vobeda, 4020 Blue River Ave., Racine, Wis. 53405
Filed Dec. 16, 1988, Ser. No. 285,244
Term of patent 14 years
U.S. Cl. D34—24



# LIST OF PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 17TH DAY OF JULY, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

A & E Systems, Inc.: *See*—
Greer, Bradley G., 4,941,524, Cl. 160-67.000.

A-LOK Products, Inc.: *See*—
Ditcher, Jack, 4,941,643, Cl. 249-145.000.

A. & M. Cousin - Etablissements Cousin/Freres: *See*—
Pipon, Yves, 4,941,637, Cl. 248-430.000.

AB Tetra Pak: *See*—
Otsuka, Yuzo, 4,941,376, Cl. 83-100.000.

AB Volvo: *See*—
Nilsson, Hans-Ove, 4,941,526, Cl. 165-32.000.

Abbott Laboratories: *See*—
Fong, Conrad T.; Grabenkort, Richard W.; Huntley, Scott P.; and Wecker, Sheldon M., 4,941,308, Cl. 53-425.000.

Abe, Hirotsugu: *See*—
Ishikawa, Youhei; Tsunoda, Kikuo; Hiratsuka, Toshiro; and Abe, Hirotsugu, 4,942,377, Cl. 333-202.000.

Abe, Masaru; Kawai, Yoichi; and Miyazaki, Takashi, to Mitsui Toatsu Chemicals, Inc. Polypropylene resin composition. 4,942,096, Cl. 428-476.100.

Abe, Yoshinori; Watanabe, Kazuo; Kimoto, Tetsuo; Hirata, Tetsuo; Kobayashi, Chiharu; and Endo, Hideki, to Konica Corporation. Digital multiple-color image processing apparatus. 4,942,461, Cl. 358-75.000.

Ablassmeier, Ulrich, to Siemens Aktiengesellschaft. Thyristor. 4,942,444, Cl. 357-38.000.

Abou-Gharbia, Magid A.; Schiehser, Guy A.; and Patel, Usha R., to American Home Products Corporation. Isothiazolone 1,1-dioxide derivatives with psychotropic activity. 4,942,234, Cl. 544-332.000.

Abu Garcia Produktion AB: *See*—
Carlson, Karl L., 4,941,626, Cl. 242-231.000.

Adahan, Carmeli. Portable ventilator apparatus. 4,941,469, Cl. 128-205.180.

Adams, Graham R.: *See*—
Pfaffmann, George D.; Balzer, Norbert R.; Kubis, Charles S.; Walter, John; Currie, John P.; and Adams, Graham R., 4,941,306, Cl. 53-306.000.

Adams, Mark C. Combined turkey call with dual sounders. 4,941,858, Cl. 446-397.000.

Adams-Russell Electronic Company, Inc.: *See*—
Guimond, Ronald; Martiniello, Anthony; Hardy, David W.; and Tellier, Raymond, 4,941,846, Cl. 439-578.000.

Addy, Timothy E.; and Speakman, Warner E., to ESI Companies, Inc. Control panel face. 4,942,275, Cl. 200-308.000.

Adler, Robert; Coult, John H.; and Strauss, Paul, to Zenith Electronics Corporation. Tied slit mask for color cathode ray tubes. 4,942,332, Cl. 313-402.000.

Advanced Biologics, Inc.: *See*—
Rotondo, Richard D., 4,942,165, Cl. 514-261.000.

Advanced Micro Devices Inc.: *See*—
Fleck, Rod; Poret, Mark; Mattheis, Karl-Heinz; Magana, Javier; and Meinhold, Christoph, 4,942,559, Cl. 368-113.000.

Advanced Nuclear Fuels. Corp.: *See*—
Busselman, Gary J.; and Reparaz, Adolfo, 4,942,015, Cl. 376-261.000.

Affupper, Hans, to Hans Affupper Textilmaschinenbau GmbH. Warp machine. 4,941,241, Cl. 28-196.000.

AG Communication Systems Corporation: *See*—
Baca, Anthony J., 4,942,595, Cl. 377-48.000.

Agarwal, Anil K.: *See*—
Panicker, Ramachandra M. P.; and Agarwal, Anil K., 4,942,076, Cl. 428-137.000.

Agency of Industrial Science and Technology: *See*—
Konishi, Shohei; Imai, Akira; Wakabayashi, Goro; and Kishioka, Hiroshi, 4,942,136, Cl. 436-512.000.

Agfa-Gevaert Aktiengesellschaft: *See*—
Renner, Gunter, 4,942,116, Cl. 430-555.000.
Wilsch, Herbert; Huber, Leonhard; Treiber, Helmut; Lermann, Peter; and Nagel, Erich, 4,941,620, Cl. 242-67.10R.

Agfa-Gevaert Aktiengesellschaft: *See*—
Schweicher, Wolfgang; Frenken, Hans; Bussmann, Heinrich; Browatzki, Kurt; and Sobel, Johannes, 4,942,068, Cl. 427-420.000.

Agilis Corporation: *See*—
Nease, Greg A.; and Cripps, Peter K., 4,942,591, Cl. 375-84.000.

Agner, Hugh R. Oarlock. 4,941,855, Cl. 440-104.000.

Agri-Automation Company, Ltd.: *See*—
Hanauer, George E., 4,941,433, Cl. 119-14.020.

Agro-Kanesho Co., Ltd.: *See*—
Toyoda, Shigeaki; Watanabe, Shunnosuke; and Tabata, Hiroshi, 4,942,178, Cl. 514-617.000.

Aigner, Thomas G.: *See*—
Weiss, Susan R. B.; Post, Robert M.; and Aigner, Thomas G., 4,942,182, Cl. 514-812.000.

AIL Systems, Inc.: *See*—
Kefer, Marvin S., 4,942,404, Cl. 342-418.000.

Air Products and Chemicals, Inc.: *See*—
Parris, Gene E.; and Armor, John N., 4,942,259, Cl. 564-187.000.
Stelts, Philip D.; Kern, David W.; and Fioravanti, Kenneth J., 4,941,646, Cl. 266-270.000.

Air Techniques Incorporated: *See*—
Hubner, Henry H., Jr., 4,941,503, Cl. 137-454.200.

Aisan Kogyo Kabushiki Kaisha: *See*—
Fukaya, Katsuyoshi, 4,942,325, Cl. 310-257.000.

Aisin Seiki Kabushiki Kaisha: *See*—
Kakinami, Toshiaki; and Hamajima, Shigemitsu, 4,942,533, Cl. 364-449.000.
Takakura, Yoshinari, 4,941,801, Cl. 415-170.100.

Aita, Kazuo: *See*—
Sumi, Kazuhiko; Hashimoto, Manabu; Sakaue, Yoshikazu; Aita, Kazuo; Sasakura, Masahiro; and Ozaki, Yutaka, 4,942,618, Cl. 382-8.000.

Aizawa, Michihiko: *See*—
Imura, Kouji; Ohuchi, Tomihisa; Kohno, Kyoji; Shimizu, Tamio; and Aizawa, Michihiko, 4,941,329, Cl. 62-476.000.

Ajinomoto Co., Inc.: *See*—
Takahashi, Satoji; and Takemoto, Tadashi, 4,942,255, Cl. 560-41.000.

Akahori, Kimihiko: *See*—
Sobue, Masahisa; Okada, Sensuke; Akahori, Kimihiko; Kuniya, Keiichi; Sasaki, Toshimi; Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nihei, Mitsuo, 4,941,251, Cl. 29-132.000.

Akebono Brake Industry Co., Ltd.: *See*—
Hirobe, Yoshiaki, 4,941,712, Cl. 303-115.000.

Akimoto, Hajime; Ohba, Shinya; and Ozaki, Toshifumi, to Hitachi, Ltd. Solid-state imaging device having photo-electric conversion elements and other circuit elements arranged to provide improved photo-sensitivity. 4,942,474, Cl. 358-213.110.

Akiyama, Eitetsu, to Honda Giken Kogyo K.K. Electronically-controlled fuel injection system for internal combustion engines. 4,941,556, Cl. 192-0.062.

Akiyama, Tatsuhiko: *See*—
Mori, Ryuichiro; Fukudome, Katsuyuki; Akiyama, Tatsuhiko; and Takemoto, Yoshitaka, 4,942,454, Cl. 357-70.000.

Aktiebolaget Electrolux: *See*—
Sjoberg, Rolf G., 4,941,689, Cl. 285-7.000.

Aktiebolaget Hasale: *See*—
Ragnarsson, Gert A.; Silfverstrand, Kajsa M.; and Sjogren, John A., 4,942,040, Cl. 424-486.000.

Albano, Joseph A. Isolating pipe strap for plumbing pipes. 4,941,630, Cl. 248-71.000.

Albany International Corporation: *See*—
Fliss, Thomas A., 4,941,239, Cl. 26-28.000.

Albert Rolland S.A.: *See*—
Moinet, Gerard; and Imbert, Thierry, 4,942,221, Cl. 558-408.000.

Albright, Alva Z. Apparatus for mounting in an aqueous system, a cartridge filter for filtering the system and in place cleaning the filter. 4,941,971, Cl. 210-107.000.

Alcan International Limited: *See*—
Hunter, John A.; Scamans, Geoffrey M.; and O'Callaghan, Wilfred B., 4,942,100, Cl. 429-50.000.

Alcorn, William R.: *See*—
Whittenberger, William A.; Smith, Edward M.; Alcorn, William R.; and Bullock, Wesley P., 4,942,020, Cl. 422-180.000.

Alcraft, Inc.: *See*—
Sugarman, Louis; and Dressler, Max B., 4,941,576, Cl. 211-13.000.

Alexander, James L. Package adapter. 4,941,622, Cl. 242-129.700.

Alexander Machinery, Inc.: *See*—
Alexander, William J., III; and Chapman, Fred A., 4,941,718, Cl. 312-312.000.

Alexander, William J., III; and Chapman, Fred A., to Alexander Machinery, Inc. Concealed retractable housings. 4,941,718, Cl. 312-312.000.

Alfieri, Mario: *See*—
Strepparola, Ezio; Alfieri, Mario; and Gavezotti, Piero, 4,941,987, Cl. 252-58.000.

Alfred Teves GmbH: *See*—
Breitwieser, Karl; and Kirchner, Wolfgang, 4,941,764, Cl. 403-24.000.

Allain, Reid P., to Kennedy, Robert B. Method and apparatus for processing shrimp. 4,941,233, Cl. 17-71.000.

Allegheny-Singer Research Institute: *See*—
Slifkin, Malcolm, 4,942,126, Cl. 435-7.000.

Allen, Bobby H., to Mitsubishi Corporation. Combination key and key holder. 4,941,335, Cl. 70-458.000.

Allen-Bradley Company, Inc.: *See*—
Merrill, Richard A.; Crockett, Bruce L.; and Strader, Robert C., 4,942,552, Cl. 364-900.000.
Allen, Don T., to Allen, Don T. Orthopedic footbrace. 4,941,272, Cl. 36-91.000.
Allen, Ralph: *See*—
Avitan, Isaac; Allen, Ralph; Kellogg, David L.; Page, Stephen L.; and Radley, David J., 4,942,529, Cl. 364-424.010.
Allied-Signal Inc.: *See*—
Cleveland, Lester G., 4,941,243, Cl. 29-25.350.
Raybould, Derek; Fish, Gordon E.; and Denk, Joseph, 4,942,322, Cl. 310-156.000.
Allman, James: *See*—
Wilcox, Richard C.; Allman, James; and Smith, Stacy, 4,941,545, Cl. 181-282.000.
Alpert, Robert S.: *See*—
Millerd, Donald L.; Bell, Marl J.; and Alpert, Robert S., 4,942,349, Cl. 318-483.000.
Alpha Industries: *See*—
Negas, Taki; and Domingues, Louis P., 4,942,146, Cl. 501-134.000.
Alphanet Technology Corporation: *See*—
Gordon, Alastair T.; and Reichmann, Michael H., 4,942,599, Cl. 379-93.000.
Altemark, Detlef; Hess, Robert; and Hillringhaus, Karl H., to Ruhrgas Aktiengesellschaft. Method and apparatus for the measurement of gas properties. 4,941,345, Cl. 73-23.200.
Altomar-II Trust by Kenneth Safe, Jr., Trustee: *See*—
Reiniger, Haigh M., 4,942,081, Cl. 428-218.000.
Amaya, Eduardo: *See*—
Foley, Kevin M.; Griffin, Charles C.; and Amaya, Eduardo, 4,942,156, Cl. 514-56.000.
Amboss, Kurt; and Davis, Jon A. Traveling-wave tube with confined-flow periodic permanent magnet focusing. 4,942,336, Cl. 315-3.500.
AMCA International Corporation: *See*—
Kasper, Frank S., 4,941,375, Cl. 83-23.000.
American Cyanamid: *See*—
Morin, Louis G., 4,942,090, Cl. 428-367.000.
American Cyanamid Company: *See*—
Guerro, Gerald J.; and Borsinger, Gregory G., 4,942,085, Cl. 428-288.000.
American Home Products Corporation: *See*—
Abou-Gharbia, Magid A.; Schiehser, Guy A.; and Patel, Usha R., 4,942,234, Cl. 544-332.000.
Musser, John H.; Bender, Reinhold H. W.; and Kreft, Anthony F., III, 4,942,236, Cl. 546-334.000.
American Standard Inc.: *See*—
Bergmann, Konrad, 4,941,506, Cl. 137-625.400.
American Sterilizer Company: *See*—
Sestak, Joseph T.; and Childers, Robert W., 4,941,519, Cl. 141-22.000.
American Telephone and Telegraph Company: *See*—
Olsson, Nils A., 4,941,738, Cl. 350-377.000.
American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
Bethea, Clyde G.; Brasen, Daniel; Levine, Barry F.; and Willens, Ronald H., 4,942,442, Cl. 357-29.000.
Zelle, Bruce R., 4,942,574, Cl. 370-85.150.
American Telephone and Telegraph Company, AT&T Technologies, Inc.: *See*—
Narasimham, Pundi L., 4,941,905, Cl. 65-3.120.
AMF Mares S.p.A.: *See*—
Giovanni, Garofalo, 4,941,468, Cl. 128-204.260.
AMG Resources Corporation: *See*—
Cutler, William, 4,941,619, Cl. 241-22.000.
Ammermann, Eberhard: *See*—
Buschmann, Ernst; Sproesser, Linhard; Zeeh, Bernd; Jung, Johann; Rademacher, Wilhelm; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,942,244, Cl. 548-268.200.
Ammon, Robert L.; Buckman, Raymond W.; and Sabol, George P., to Westinghouse Electric Corp. Method of fabricating shaped brittle intermetallic compounds. 4,941,928, Cl. 148-2.000.
Amoco Corporation: *See*—
Ceisel, Stephen C.; Conrad, James F.; Lestan, Elizabeth M.; and Nelson, Allen P., 4,941,895, Cl. 55-84.000.
Smith, Thomas G., 4,942,258, Cl. 562-599.000.
Amouroux, Jacques; and Nikravech, Mehrdad, to Electricite de France (Service National). Process for the hydrocracking of a hydrocarbon feedstock and hydrocracking plant for carrying. 4,941,965, Cl. 208-108.000.
AMP Incorporated: *See*—
Bormuth, Peter, 4,941,836, Cl. 439-247.000.
Fujiura, Yoshitsugu, 4,941,849, Cl. 439-610.000.
Korsunsky, Iosif; Kopp, Monte L.; and Grabbe, Dimitry G., 4,941,832, Cl. 439-71.000.
Ohshima, Tsutomu, 4,942,009, Cl. 264-317.000.
Williams, Richard T.; and Wu, Jeff C., 4,941,734, Cl. 350-321.000.
Anadrill, Inc.: *See*—
Sheppard, Michael; and Hedayati, Zhian, 4,941,951, Cl. 175-48.000.
Andersen, Gary R.: *See*—
Perfetti, Patricia F.; and Andersen, Gary R., 4,941,485, Cl. 131-365.000.
Anderson, Allison E.: *See*—
Clark, David F., 4,941,238, Cl. 24-437.000.
Anderson, Dorothy S., executor: *See*—
Anderson, Francis G., deceased; and Anderson, Dorothy S., executor, 4,941,431, Cl. 119-1.000.
Anderson, Francis G., deceased; and by Anderson, Dorothy S., executor. System for handling laboratory animals. 4,941,431, Cl. 119-1.000.
Anderson, John D.: *See*—
Asawa, Charles K.; Yao, Shi-Kay; and Anderson, John D., 4,942,623, Cl. 455-612.000.
Anderson, Michael W., to Moore Business Forms, Inc. Multiple part facsimile form. 4,941,685, Cl. 282-1.00R.
Anderson, Robert K.; Foster, Ruth E.; and Carlson, Bertyl W., to University of Minnesota, Regents of the. Humane training aid with adjustable muzzle loop having an adjustable locking device. 4,941,313, Cl. 54-24.000.
Anderson, Ron L., to Suzuki Jidosha Kogyo Kabushiki Kaisha. Steering mechanism for aquatic vehicle. 4,941,421, Cl. 114-144.00R.
Anderson, Scott R.: *See*—
Lauritzen, Donald R.; Ward, Michael J.; and Anderson, Scott R., 4,941,678, Cl. 280-732.000.
Andrews, Harry N.: *See*—
Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., 4,941,577, Cl. 211-70.600.
Angwin, George T., to MSC Technologies, Inc. Method for mapping scanned pixel data. 4,942,621, Cl. 382-59.000.
Anic, Jure; Dederichs, Walburga; Huybrechts, Lucas E. A.; and Johnson, Harry, to Cerestar Holding DV. Method of adding boric acid of a borate to a mixing CER-1 or reaction zone. 4,941,921, Cl. 106-213.000.
Ankers, Malcolm D.; and Weston, Roy E. Shielded cable connector. 4,941,850, Cl. 439-610.000.
Ansel, Robert E.: *See*—
Murphy, Edward J.; Ansel, Robert E.; and Krajewski, John J., 4,942,001, Cl. 264-22.000.
Anstey, Henry D.: *See*—
Ardueser, William A.; Rumph, George W.; and Anstey, Henry D., 4,941,311, Cl. 53-587.000.
Anthoine, Philippe: *See*—
Aubert, Lucien; and Anthoine, Philippe, 4,942,033, Cl. 424-195.100.
Aoki, Katashi, deceased; and by Kimura, Satoru, heir. Rotary type injection blow molding machine. 4,941,816, Cl. 425-533.000.
Aoki, Masakazu: *See*—
Sasaki, Toshio; Aoki, Masakazu; Horiguchi, Masashi; Nakagome, Yoshinobu; Ikenaga, Shinichi; and Masuhara, Toshiaki, 4,942,556, Cl. 365-200.000.
Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, to Honda Giken Kogyo Kabushiki Kaisha. Apparatus for shift control in an automatic transmission. 4,941,372, Cl. 74-878.000.
Aoki, Yoshihiro, to Application Art Laboratories Co., Ltd. Magnetic lock closure device. 4,941,235, Cl. 24-303.000.
Application Art Laboratories Co., Ltd.: *See*—
Aoki, Yoshihiro, 4,941,235, Cl. 24-303.000.
Aquametrics, Inc.: *See*—
Bireley, Richard L., 4,941,501, Cl. 137-78.300.
Ar, Ran G.: *See*—
Zeevi, Yehoshua Y.; Ar, Ran G.; and Hilsenrath, Oliver, 4,942,473, Cl. 358-213.260.
Arai, Shigeyoshi; Sugita, Kyoko; Isomura, Shohei; and Kaetsu, Hayato, to Rikagaku Kenkyusho. Method of enriching the isotope carbon 13 by means of laser irradiation. 4,941,956, Cl. 204-157.200.
Arai, Takao: *See*—
Noguchi, Takaharu; and Arai, Takao, 4,942,487, Cl. 360-77.130.
Arakawa, Hajime; Yamaoka, Osamu; Kubota, Kazuyuki; Kakio, Motoaki; Azuma, Yoshimasa; and Nagashima, Mitsuru, to Murata Manufacturing Co., Ltd. Ceramic capacitor and manufacturing method thereof. 4,942,496, Cl. 361-321.000.
Araki, Kazui; Kobayashi, Yoshio; Matsumoto, Seiji; and Fukushima, Hisao, to Shigeru Kogyo Kabushiki Kaisha. Vacuum forming apparatus. 4,941,814, Cl. 425-388.000.
Araki, Shin: *See*—
Sugimoto, Hachiro; Nakamura, Takaharu; Tsuchiya, Yutaka; Sugumi, Hiroyuki; Higurashi, Kunizou; Karibe, Norio; Yamanishi, Yoshiharu; Ogura, Hiroo; Araki, Shin; Kubota, Atsuhiko; Ohtake, Michiko; and Tamatsu, Kiyomi, 4,942,169, Cl. 514-318.000.
Arashi, Toshimi: *See*—
Takase, Minoru; Ueno, Naoya; and Arashi, Toshimi, 4,941,730, Cl. 350-96.340.
Arch Development Corporation: *See*—
Capone, Donald W.; Dunlap, Bobby D.; and Veal, Boyd W., 4,942,151, Cl. 505-1.000.
Archer, H. Brent: *See*—
Hull, Frank A.; Archer, H. Brent; and Frederick, Curt, 4,941,746, Cl. 356-444.000.
Ardco, Inc.: *See*—
Rolek, Matthew, 4,941,289, Cl. 49-504.000.
Ardit, Giuseppe; Cigana, Fiorenzo; and Magris, Renzo, to Procond Elettronica S.p.A. Circuit for controlling rotational direction and rotational speed of an electric motor. 4,942,346, Cl. 318-280.000.
Ardueser, William A.; Rumph, George W.; and Anstey, Henry D., to Deere & Company. Wrap material roll housing cover having sealed hinge joint and gas spring biasing means. 4,941,311, Cl. 53-587.000.
Arendt, Timothy R., to K & A Tool Company. Quick disconnect device. 4,941,768, Cl. 403-331.000.
Ariki, Yoshio: *See*—
Hisada, Takanori; Maruyama, Takesuke; Deguchi, Masaharu; Noro, Yoshihiko; Honma, Yoshifumi; Ariki, Yoshio; and Taguchi, Shunichi, 4,941,719, Cl. 350-6.800.
Armor, John N.: *See*—
Parris, Gene E.; and Armor, John N., 4,942,259, Cl. 564-187.000.

Armstrong, Edward. Support structure for multiple plants. 4,941,283, Cl. 47-67.000.

Arsenault, Duane R., to Kirby, Alan J.; and Arsenault, Duane R. Toy roadway tile. 4,941,611, Cl. 238-10.00A.

Arvin Industries, Inc.: *See*—
Wilcox, Richard C.; Allman, James; and Smith, Stacy, 4,941,545, Cl. 181-282.000.

Asada, Eiji; Tomikawa, Takashi; and Fukuoka, Tatsuhiko, to Taiho Kogyo Co., Ltd. Copper-based sliding material and method for producing the same. 4,941,919, Cl. 75-235.000.

Asahi Kasei Kogyo Kabushiki Kaisha: *See*—
Nishijima, Jun-ichi; and Fukui, Minoru, 4,942,364, Cl. 324-696.000.

Asahi Kogaku Kogyo Kabushiki Kaisha: *See*—
Takahashi, Norimichi; Tanaka, Hitoshi; and Maruyama, Koichi, 4,942,414, Cl. 354-195.120.

Asakawa, Toshiyuki: *See*—
Kitajima, Tadayuki; Asakawa, Toshiyuki; Naito, Masataka; Matsuo, Kazuhiro; and Murayama, Toshiaki, 4,941,657, Cl. 271-293.000.

Asawa, Charles K.; Yao, Shi-Kay; and Anderson, John D., to TRW Inc. Device and method for modal separation and combination in an optical fiber intrusion detection system. 4,942,623, Cl. 455-612.000.

Asbeck, Adolf: *See*—
Schmid, Karl H.; Meffert, Alfred; Schenker, Gilbert; and Asbeck, Adolf, 4,942,049, Cl. 426-329.000.

Asea Brown Boveri Aktiengesellschaft: *See*—
Betz, Monika, 4,941,952, Cl. 201-1.000.
Kinzel, Helmut, 4,942,313, Cl. 307-326.000.

Ashida, Shinichiro: *See*—
Masumura, Hidemi; Sakuma, Kyoko; and Ashida, Shinichiro, 4,942,171, Cl. 514-399.000.

Ashland Oil Inc.: *See*—
Bowers, Robert B.; and Chookazian, Mark, 4,941,584, Cl. 220-5.00R.

ASI Technologies, Inc.: *See*—
Kersten, Otto E.; Moll, Jack E.; and Balbach, George C., 4,941,320, Cl. 60-437.000.

Associated Universities, Inc.: *See*—
Kolber, Zbigniew; and Falkowski, Paul, 4,942,303, Cl. 250-458.100.

AT&T Bell Laboratories: *See*—
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,941,795, Cl. 414-403.000.
Hardin, Tommy G.; and Khorramian, Behrooz A., 4,941,729, Cl. 350-96.230.

Atochem: *See*—
Labaig, Jean-Jacques; Fenie, Michel; and Glotin, Michel, 4,942,070, Cl. 428-36.900.

Aubert, Lucien; and Anthoine, Philippe, to L'Oreal. Vegetable extract-based cosmetic or pharmaceutical composition which acts on capillary brittleness. 4,942,033, Cl. 424-195.100.

Audebert, Jean F.; and Mauchaussee, Daniel, to CIPEL; and WONDER. Electrochemical cell having an alkaline electrolyte and a zinc negative electrode. 4,942,101, Cl. 429-165.000.

AUER-SOG Glaswerke GmbH: *See*—
Wagener, Harry, 4,942,507, Cl. 362-296.000.

Ausimont S.p.A.: *See*—
Condo, Antonino; and Ferrario, Renzo, 4,942,025, Cl. 423-282.000.
Strepparola, Ezio; Alfieri, Mario; and Gavezotti, Piero, 4,941,987, Cl. 252-58.000.

Austin, Larry W.; and Linde, Harold G., to International Business Machines Corporation. Method of anisotropically etching silicon wafers and wafer etching solution. 4,941,941, Cl. 156-647.000.

Austin Rover Group Limited: *See*—
Emery, Ralph S., 4,941,337, Cl. 72-88.000.

Australian Atomic Energy Commission: *See*—
Hamilton, Norman, 4,942,614, Cl. 364-571.010.

Automated Cleaning Systems, Inc.: *See*—
Goerss, William G.; and Farrah, William J., 4,941,491, Cl. 134-111.000.

Automotive Products plc: *See*—
Leigh-Monstevens, Keith V., 4,941,323, Cl. 60-589.000.

Avera, Fitzhugh L., to PBFB Licensing Corporation. Gravitationally-stabilized peanut-containing composition. 4,942,055, Cl. 426-633.000.

Avitan, Isaac; Allen, Ralph; Kellogg, David L.; Page, Stephen L.; and Radley, David J., to Raymond Corporation, The. Lift truck control systems. 4,942,529, Cl. 364-424.010.

Awano, Katsuya: *See*—
Masuzawa, Kuniyoshi; Okamura, Kyuya; Nishino, Keigo; Ohashi, Mitsuo; and Awano, Katsuya, 4,942,245, Cl. 548-329.000.

Azuma, Yoshimasa: *See*—
Arakawa, Hajime; Yamaoka, Osamu; Kubota, Kazuyuki; Kakio, Motoaki; Azuma, Yoshimasa; and Nagashima, Mitsuru, 4,942,496, Cl. 361-321.000.

Baba, Masatoshi: *See*—
Tanaka, Norio; Kakuta, Takuya; Oya, Eiichi; and Baba, Masatoshi, 4,942,246, Cl. 548-367.000.

Babczinski, Peter: *See*—
Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,912, Cl. 71-92.000.

Baca, Anthony J., to AG Communication Systems Corporation. Circuit for dividing the frequency of a digital clock signal by two and one-half. 4,942,595, Cl. 377-48.000.

Bacigalupe, Carlos: *See*—
Stewart, G. Wayne; Davis, Bill E.; Thomas, William M.; Dobie, Michael J.; and Bacigalupe, Carlos, 4,941,819, Cl. 432-8.000.

Baer, Thomas M.: *See*—
Kintz, Gregory J.; Baer, Thomas M.; and Kafka, James D., 4,942,582, Cl. 372-18.000.

Baiker, Walter. Multipurpose chassis for commercial and special vehicles. 4,941,680, Cl. 280-793.000.

Bailey, Raymond J., to GDT Pty. Ltd. Security device for trolleys. 4,941,560, Cl. 194-250.000.

Bailey, Thomas R.: *See*—
Diana, Guy D.; and Bailey, Thomas R., 4,942,241, Cl. 548-131.000.

Baits, Paul G.: *See*—
Rozman, Gregory I.; and Baits, Paul G., 4,942,493, Cl. 361-23.000.

Baker Hughes Incorporated: *See*—
Berzin, Vel, 4,941,534, Cl. 166-285.000.
Perricone, Alphonse C.; Clapper, Dennis K.; and Enright, Dorothy P., 4,941,981, Cl. 252-8.510.

Baker, W. Howard, to Wynn's-Precision, Inc. Method of injection molding of tubular parts to eliminate weld lines. 4,942,010, Cl. 264-328.120.

Baker, William T., Jr.; Buffum, Charles M.; Jolissaint, Charles H.; and Kerlin, Gregg W., to International Business Machines Corporation. Coordinated transfer of voice and information through a network of digital switches. 4,942,602, Cl. 379-212.000.

Balbach, George C.: *See*—
Kersten, Otto E.; Moll, Jack E.; and Balbach, George C., 4,941,320, Cl. 60-437.000.

Baldwin, William C.: *See*—
Dodd, Richard E.; and Baldwin, William C., 4,941,393, Cl. 89-35.010.

Baliga, Bantval J.; and Wildi, Eric J., to General Electric Company. High voltage semiconductor devices with reduced on-resistance. 4,942,440, Cl. 357-23.100.

Baliga, Bantval J.; and Chang, Hsueh-Rong, to General Electric Company. Lateral depletion mode tyristor. 4,942,445, Cl. 357-38.000.

Ballheimer, Benny: *See*—
Weber, Robert L.; Kamman, Kenneth R.; Ballheimer, Benny; and Shoup, Stephen G., 4,941,440, Cl. 123-193.00P.

Balliet, Layton: *See*—
Couden, Donald V.; Karr, Paul C.; and Balliet, Layton, 4,941,724, Cl. 350-96.180.

Balzer, Norbert R.: *See*—
Pfaffmann, George D.; Balzer, Norbert R.; Kubis, Charles S.; Walter, John; Currie, John P.; and Adams, Graham R., 4,941,306, Cl. 53-306.000.

Bando Kagaku Kabushiki Kaisha: *See*—
Nakagaki, Toshio, 4,941,294, Cl. 51-328.000.

Banerjee, Chandra K.: *See*—
Ridings, Henry T.; and Banerjee, Chandra K., 4,941,483, Cl. 131-194.000.

Bansemir, Klaus: *See*—
Guhl, Walter; and Bansemir, Klaus, 4,942,041, Cl. 424-613.000.

Banton, Martin E.; and Harrigan, Michael E., to Xerox Corporation. Raster scanning system utilizing overfilled polygon facet design. 4,941,721, Cl. 350-6.800.

Barber, John P., to IAP Research, Inc. High-speed superconducting switch and method. 4,942,378, Cl. 335-216.000.

Barch, Herbert W.; and Marshall, William P., to PPG Industries, Inc. Method and apparatus for forming hollow fibers. 4,941,904, Cl. 65-1.000.

Barnes, Derek: *See*—
Redekop, Alfred W. J.; and Barnes, Derek, 4,941,521, Cl. 144-347.000.

Barrett, Charles G.; and Malloy, James B. Wrench socket holder. 4,941,571, Cl. 206-378.000.

Barrick (USA) Inc.: *See*—
Cenegy, Lawrence M.; Deal, Samuel G.; Cooley, Max E.; and Clark, Paul B., 4,941,917, Cl. 75-744.000.

Barry, Christopher J., to Libbey-Owens-Ford Co. Insulating double glazed window assembly. 4,941,302, Cl. 52-171.000.

Barry Controls GmbH: *See*—
Heiland, Klaus-Peter, 4,941,265, Cl. 33-504.000.

Bartel, Peter; and Schuler, Rolf, to Kiekert GmbH & Co. Kommanditgesellschaft. Power actuator for motor-vehicle central lock system. 4,941,694, Cl. 292-201.000.

Bartels, Craig R.; and Reale, John, Jr., to Texaco Inc. Dehydration of glycols. 4,941,976, Cl. 210-490.000.

Bartels, James I.; Seidel, Michael J.; and Schimbke, Paul A., to Honeywell Inc. Method and apparatus and controlling firing rate in a heating system. 4,941,609, Cl. 236-78.00D.

Bartley, Burton H.: *See*—
Dai, Pei-Shing E.; Sherwood, David E., Jr.; Bartley, Burton H.; and Petty, Randall H., 4,941,964, Cl. 208-216.0PP.

Barwig, Karlhorst; Ortkrass, Gerd; and Klimasek, Guenther, to Siemens Aktiengesellschaft. Optical cable network with an excess number of leads in reserve. 4,941,720, Cl. 350-96.200.

BASF Aktiengesellschaft: *See*—
Buchert, Hermann; Grimm, Gerhard; and Muenstedt, Helmut, 4,942,095, Cl. 428-461.000.
Buschmann, Ernst; Sproesser, Linhard; Zeeh, Bernd; Jung, Johann; Rademacher, Wilhelm; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,942,244, Cl. 548-268.200.
Freund, Wolfgang; Hamprecht, Gerhard; Wuerzer, Bruno; Westphalen, Karl-Otto; and Meyer, Norbert, 4,941,911, Cl. 71-92.000.

Heinz, Gerhard; Lieder, Robert R.; and Koch, Juergen, 4,942,216, Cl. 528-125.000.
Ruske, Manfred; and Patsch, Manfred, 4,942,232, Cl. 544-76.000.

Basf Lacke & Farben Aktiengesellschaft: *See*—
Dickerhof, Karl-heinz; and Schwarz, Gunther, 4,942,198, Cl. 524-510.000.

Basse, Alain G.: *See*—
Ducarroir, Michel R.; Male, Germain J.; Nadal, Marcel F.; Basse, Alain G.; Pizzini, Gerard P.; and Cazajous, Didier P., 4,942,062, Cl. 427-249.000.

Baum, Kurt; Malik, Aslam A.; and Tzeng, Donald D., to Fluorochem Inc. Polyfluorinated diisocyanates and fluorinated polyurethanes prepared therefrom. 4,942,164, Cl. 528-70.000.

Baumann, Karl-Heinz; Holtze, Herbert; Wunsche, Martin; and Schwede, Wolfgang, to Daimler-Benz AG. Axially adjustable steering device for motor vehicles. 4,941,679, Cl. 280-775.000.

Baumert, Heinz; Bruhnke, Ulrich; Greiner, Ferdinand; and Nothacker, Siegfried, to Daimler-Benz AG. Sun visor for vehicles. 4,941,704, Cl. 296-97.110.

Bayer Aktiengesellschaft: *See*—
Bier, Peter; Reinking, Klaus; Bottenbruch, Ludwig; and Tresper, Erhard, 4,942,194, Cl. 524-281.000.
Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,912, Cl. 71-92.000.
Lorenz, Manfred, 4,942,225, Cl. 534-560.000.
Muller, Klaus-Helmut; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,910, Cl. 71-92.000.
Pusch, Werner; and Ullrich, Martin, 4,941,748, Cl. 366-85.000.

Baymak, Faruk; and Stueben, Helmut, to Messerschmitt-Boelkow-Blohm GmbH. Device for permanently indicating an overstretching of a safety seat belt, especially in an aircraft. 4,941,710, Cl. 297-471.000.

Beaulieu, Bryan J., to Skyline Displays, Inc. Knockdown table and cabinet structure. 4,941,717, Cl. 312-265.300.

Beauvir, Jacques. Manual fluid-control valve with limited closing pressure. 4,941,504, Cl. 137-524.000.

Becher, Reinhard. Mechanical drilling aid. 4,941,781, Cl. 408-72.00B.

Bechtold, Stephen K. Chain assembly. 4,941,316, Cl. 59-78.000.

Becker, James Y., to Du Pont de Nemours, E. I., and Company. Electrochemical preparation of branched unsaturated dinitriles. 4,941,954, Cl. 204-59.00R.

Beckman Instruments, Inc.: *See*—
Chulay, Steven J., deceased; Minton, Allen P.; and Giebeler, Robert, 4,941,868, Cl. 494-37.000.

Beech, Brian J.; and Beech, Edwin T., to Sildean Limited. Die sets. 4,941,344, Cl. 72-456.000.

Beech, Edwin T.: *See*—
Beech, Brian J.; and Beech, Edwin T., 4,941,344, Cl. 72-456.000.

Beecham Group p.l.c.: *See*—
Harnden, Michael R.; Jarvest, Richard L.; and Geen, Graham R., 4,942,166, Cl. 514-262.000.
Sanger, Gareth J.; and Marr, Helen E., 4,942,160, Cl. 514-216.000.

Beeley, Michael G.; Gittins, James D.; and Sinykin, William B., to Logan Manufacturing Company. Snow Groomer vehicle hydraulic hose guide. 4,941,275, Cl. 37-219.000.

Beer, Michael; Schimko, Philipp; Hofbauer, August; and Kroner, Matthias, to Dr. Ing. h.c.F. Porsche AG. Cooling system for I.C.E. valve seat inserts. 4,941,436, Cl. 123-41.770.

Beerwald, Hans; and Bohm, Gunter. Spark gap apparatus triggerable by microwave pulse. 4,942,337, Cl. 315-39.000.

Begerow, Klaus: *See*—
Henn, Manfred; Begerow, Klaus; and Wichert, Volker, 4,941,946, Cl. 162-36.000.

Behrens, Carl H., to Du Pont de Nemours, E. I., and Company. 1(2H)-isoquinolinones and 1-isoquinolineamines as cancer chemotherapeutic agents. 4,942,163, Cl. 514-254.000.

Belanger, Daniel J.; and Petracek, Frank A. Fastening mechanism for squeegee holder. 4,941,228, Cl. 15-245.000.

Belew-Noah, Patricia W.: *See*—
Rosenberg, E. William; and Belew-Noah, Patricia W., 4,942,162, Cl. 514-252.000.

Belgian Electronic Research S. A.: *See*—
Toussaint, Daniel, 4,942,498, Cl. 361-388.000.

Bell & Howell Company: *See*—
Hainsworth, Thomas E.; Spanhak, F. Nicholaas; and Paske, Richard R., Jr., 4,942,531, Cl. 364-424.200.

Bell, Marl J.: *See*—
Millerd, Donald L.; Bell, Marl J.; and Alpert, Robert S., 4,942,349, Cl. 318-483.000.

Bell, Peter W.; Queen, David S.; and Smith, John B., to Sanquhar Tile Services Limited. Carpet tile. 4,942,074, Cl. 428-95.000.

Bellemare, Richard A.: *See*—
Patel, Gordhanbhai N.; Bolikal, Durgadas; and Bellemare, Richard A., 4,941,940, Cl. 156-628.000.

Beloit Corporation: *See*—
Sanford, Charles L., 4,941,950, Cl. 162-343.000.

Ben-Dak, Joseph D.: *See*—
Frank, Amos; and Kehat, Joel, 4,941,684, Cl. 281-42.000.

Bender, Reinhold H. W.: *See*—
Musser, John H.; Bender, Reinhold H. W.; and Kreft, Anthony F., III, 4,942,236, Cl. 546-334.000.

Benedict, Risque L. Cathodic protection of critical offshore marine structure critical components by making the critical component noble (passive) to the balance of the platform. 4,941,775, Cl. 405-216.000.

Benfaremo, Nicholas; Kapuscinski, Maria M.; and Nalesnik, Theodore E., to Texaco Inc. Dispersant/antioxidant VII lubricant additive. 4,941,985, Cl. 252-51.50R.

Bennett, Robert L.: *See*—
Klibert, Jeffrey M.; Kleinert, Stephen S.; and Bennett, Robert L., 4,941,698, Cl. 294-82.120.

Bennett, Sam H. Exercise device. 4,941,673, Cl. 280-112.200.

Benyaker, Raymond M.: *See*—
Hicks, Robert C.; and Benyaker, Raymond M., 4,941,593, Cl. 222-148.000.

Benz & Hilgers GmbH: *See*—
Proepper, Wilhelm; Juenkersfeld, Harald; and Fischer, Georg, 4,941,562, Cl. 198-416.000.

Beranger, Herve ; Brunin, Armand; Caplier, Bruno; and Rousseau, Jean-Paul, to International Business Machines Corporation. Cascode logic circuit including a positive level shift at the input of the top logic stage. 4,942,316, Cl. 307-455.000.

Berard, Serge: *See*—
Cournoyer, Andre; Berard, Serge; and Cote, Denis, 4,941,331, Cl. 66-25.000.

Berger, Lawrence W.: *See*—
Hurt, Floyd R.; and Berger, Lawrence W., 4,941,532, Cl. 166-216.000.

Bergman, Rolf S.; and Harris, William O., to General Electric Company. Filament alignment spud for incandescent lamps. 4,942,331, Cl. 313-271.000.

Bergmann Kabelwerke AG: *See*—
Moller, Antonius; Reimann, Herbert; Schurmann, Bernhard; and Wilts, Gerold, 4,942,571, Cl. 370-85.100.

Bergmann, Konrad, to American Standard Inc. Sanitary mixing valve. 4,941,506, Cl. 137-625.400.

Berning, Louis G. Walker with pivoting wheel. 4,941,496, Cl. 135-67.000.

Bernstein, Lawrence A. Universal electric wheeled chair. 4,941,540, Cl. 180-65.100.

Berriochoa, Gary H.; and Dudley, Howard, to Technical Chemical Company. Dispenser lock assembly for a pressurized container. 4,941,600, Cl. 222-402.130.

Bertholdt, Horst-Otto; and Kress, Bernhard, to Siemens Aktiengesellschaft. Method for the chemical decontamination of large components and systems of metallic materials of nuclear reactors. 4,942,594, Cl. 376-310.000.

Berzin, Vel, to Baker Hughes Incorporated. Method and apparatus for sealing a casing in a subterranean well bore. 4,941,534, Cl. 166-285.000.

Bethea, Clyde G.; Brasen, Daniel; Levine, Barry F.; and Willens, Ronald H., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Device including a radiation sensor. 4,942,442, Cl. 357-29.000.

Bethlehem Steel Corporation: *See*—
Stelts, Philip D.; Kern, David W.; and Fioravanti, Kenneth J., 4,941,646, Cl. 266-270.000.

Bettcher Industries, Inc.: *See*—
Decker, Richard B.; and Hummel, Joseph, 4,941,232, Cl. 16-111.00R.

Betz Laboratories, Inc.: *See*—
Kessler, Stephen M., 4,941,979, Cl. 210-697.000.
Reid, Dwight K., 4,941,968, Cl. 208-236.000.

Betz, Monika, to Asea Brown Boveri Aktiengesellschaft. Process for the treatment of waste material. 4,941,952, Cl. 201-1.000.

Bhargava, Hridaya; and Juttesu, Jacques, to Societe de Conseils de Recherches et d'Applications Scientifiques (S. C. A. S.). Anti-diarrhea compositions. 4,942,042, Cl. 424-683.000.

Bida, Sam, to Sam Bida. Method and apparatus for plasma containment. 4,942,338, Cl. 315-111.710.

Bier, Peter; Reinking, Klaus; Bottenbruch, Ludwig; and Tresper, Erhard, to Bayer Aktiengesellschaft. Rapid-crystallizing polyphenylene sulphide compositions. 4,942,194, Cl. 524-281.000.

Bigelow, Donald O.; and Palone, Thomas W., to Eastman Kodak Company. Device to stabilize a notched web in a vacuum box. 4,941,606, Cl. 226-118.000.

Bini, Giovanni: *See*—
Da Rio, Luciano; and Bini, Giovanni, 4,942,543, Cl. 364-550.000.

Bioject, Inc.: *See*—
Burns, Marvin, 4,941,880, Cl. 604-143.000.

Biomembrane Institute, The: *See*—
Clausen, Henrik, 4,942,224, Cl. 530-387.000.

Bireley, Richard L., to Aquametrics, Inc. Sensor system. 4,941,501, Cl. 137-78.300.

Bissegger, Marcel; and Stegmann, Alain, to Saphirwerk Industrieprodukte AG. Feeler device for forming a measurement value when sensing a workpiece. 4,941,266, Cl. 33-556.000.

Black, Darryl P.; and Ricci, Elizabeth G., to Wang Laboratories, Inc. Method an apparatus for specification of communication parameters. 4,942,540, Cl. 364-514.000.

Black, James B., to Hankison Division of Hansen, Inc. Gas drying or fractioning apparatus and method. 4,941,894, Cl. 55-20.000.

Black, Stuart K.: *See*—
Chum, Helena L.; and Black, Stuart K., 4,942,269, Cl. 585-240.000.

Blake, Kenneth D. Bearing lubricating device. 4,941,550, Cl. 184-5.100.

Blake, Rodger D.: *See*—
Sheinberg, Haskell; Meek, Thomas T.; and Blake, Rodger D., 4,942,278, Cl. 219-10.55M.

Blake, Thomas S.: *See*—
Fernwood, Mark; and Blake, Thomas S., 4,941,298, Cl. 51-438.000.

Blanchard, Mark W. Fall arresting device for climbers. 4,941,548, Cl. 182-234.000.

Blessing, Hubert, to Levi Strauss & Co. Centrifugally draining single drum washing machine. 4,941,333, Cl. 68-19.200.

Bluthe, Norbert; and Perron, Robert, to Rhone-Poulenc Chimie. Preparation of aromatic aldehydes. 4,942,240, Cl. 546-298.000.

Blutstein, Morton, to Reliable Knitting Works. Cold weather hood. 4,941,211, Cl. 2-202.000.

Board of Regents, the University of Texas System: *See*—
Brown, R. Malcolm, Jr., 4,942,128, Cl. 435-101.000.

Bock, Immo E.; Nathan, Philip L.; and Malpage, Peter O., to Johannesburg Construction Corporation (Proprietary) Limited. Electrical trunkline system. 4,941,843, Cl. 439-425.000.

Boda, Keiji; Waki, Kouichirou; Niide, Kazuo; Yokota, Hiroaki; Yanagisawa, Keizo; and Takeuchi, Hokuto, to Mazda Motor Corporation; and Japan Automatic Transmission Co., Ltd. Control of vehicle automatic transmission. 4,942,530, Cl. 364-424.100.

Bodine, Robert L., Sr. Tubing clamp assembly. 4,941,690, Cl. 285-38.000.

Boehringer Mannheim GmbH: *See*—
Gall, Rudi; and Bosies, Elmar, 4,942,157, Cl. 514-108.000.

Boer, Jort, to N.V. Machinefabriek Terlet. Processing apparatus for viscous materials. 4,941,529, Cl. 165-94.000.

Bohm, Alfred: *See*—
Denzler, Karl; Bohm, Alfred; and Wirth, Alfred, 4,941,240, Cl. 28-187.000.

Bohm, Gunter: *See*—
Beerwald, Hans; and Bohm, Gunter, 4,942,337, Cl. 315-39.000.

Bold, Jorg, to "Wurtex" Maschinenbau Hofmann GmbH & Co. Method for continuously producing molded members from a mixture of gypsum and fibrous material. 4,942,003, Cl. 264-40.400.

Bolduc, Lee R. Aerosol dispenser. 4,941,615, Cl. 239-309.000.

Bolikal, Durgadas: *See*—
Patel, Gordhanbhai N.; Bolikal, Durgadas; and Bellemare, Richard A., 4,941,940, Cl. 156-628.000.

Bolt, John D.; Dinh, Steven M.; and Silverman, Lee A., to Du Pont de Nemours, E. I., and Company. Process for preparing silicon carbide fibers. 4,942,011, Cl. 264-29.200.

Bondi, Joseph V.; and Loper, Alice E., to Merck & Co., Inc. Transdermal delivery systems. 4,942,037, Cl. 424-448.000.

Bonnar, Gerard R.: *See*—
Palmer, Raymond J.; Bonnar, Gerard R.; and Moore, William E., 4,942,013, Cl. 264-511.000.

Borden, Inc.: *See*—
Rogers, John W., 4,942,191, Cl. 524-17.000.

Borgarello, Enrico; Carlini, Filippo M.; Neri, Carlo; and Platone, Edoardo, to Eniricherche S.p.A.; and Enichem Synthesis S.p.A. Single-phase composition containing a perfluorinated oil and one or more surfactant(s), useful as an excipient for cosmetic and dermatologic formulations, as well as for biomedical applications. 4,942,179, Cl. 514-659.000.

Bormuth, Peter, to AMP Incorporated. Connector housing with movable terminals. 4,941,836, Cl. 439-247.000.

Bornzin, Gene A.: *See*—
Williams, Wilbur R.; Bornzin, Gene A.; and Thompson, John S., 4,941,475, Cl. 128-692.000.

Borschneck, Anthony G. Ischial perineal cushion for emergency traction splint. 4,941,465, Cl. 128-87.00R.

Borsinger, Gregory G.: *See*—
Guerro, Gerald J.; and Borsinger, Gregory G., 4,942,085, Cl. 428-288.000.

Bosch, Erhard: *See*—
Sommer, Oswin; Dorsch, Norman; Bosch, Erhard; and Kurz, Alfred, 4,942,211, Cl. 528-14.000.

Bosgiraud, Jean-Michel; and Cendre, Andre, to Seamet International; and S.M.F. International. Catenary anchorage line for a floating vehicle and device and method for using this anchorage line. 4,941,776, Cl. 405-224.000.

Bosies, Elmar: *See*—
Gall, Rudi; and Bosies, Elmar, 4,942,157, Cl. 514-108.000.

Boston, Malcolm E., to Tecvac Limited. Ion implantation. 4,942,304, Cl. 250-492.300.

Bottenbruch, Ludwig: *See*—
Bier, Peter; Reinking, Klaus; Bottenbruch, Ludwig; and Tresper, Erhard, 4,942,194, Cl. 524-281.000.

Bottum, Robert O., to Exmark Manufacturing Company Incorporated. Clutchable pulley system sans idler-pulley. 4,941,864, Cl. 474-133.000.

Boublil, David. Lift for giving access to the water in a swimming bath or a re-education pool. 4,941,216, Cl. 4-496.000.

Bouchez, Alain; Cognard, Patrice; Marie, Gerard; and Schmidt, Alain, to Societe Anonyme: Moritz. Hub for an agitator having hollow blades and an internal heat-conveying fluid flow circuit. 4,941,749, Cl. 366-147.000.

Bouchez, Alain; Cognard, Patrice; Gearard, Marie; and Schmidt, Alain, to Societe Anonyme: Moritz. Moving agitator member for apparatus for mixing substances in powder, paste, or granular form. 4,941,750, Cl. 366-147.000.

Boutin, Jean; Brun, Pierre; and Lamaze, Airy-Pierre, to Compagnie Europeenne Du Zirconium Cezus. Process and apparatus for supplying a kroll reactor with zirconium tetrachloride vapour. 4,941,916, Cl. 75-10.120.

Boutquet, Daniel: *See*—
Loret, Marc; Boutquet, Daniel; and Le Pen, Yannick, 4,942,392, Cl. 340-782.000.

Bowden, Wesley E.; and Swan, Michael D., to Hopkins Manufacturing Corporation. Electrical connector. 4,941,844, Cl. 439-425.000.

Bowers, Robert B.; and Chookazian, Mark, to Ashland Oil Inc. Reusable plastic drum container assembly. 4,941,584, Cl. 220-5.00R.

Bowles Fluidics Corporation: *See*—
Morris, Joseph W.; and Melbourne, Thomas A., 4,941,398, Cl. 98-2.000.

Bowne, Arlyce T.: *See*—
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,942,117, Cl. 430-558.000.
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,942,118, Cl. 430-558.000.

Boyce, Henrietta E.: *See*—
Boyce, Marion E.; and Boyce, Henrietta E., 4,941,495, Cl. 135-65.000.

Boyce, Marion E.; and Boyce, Henrietta E. Convalescent aid. 4,941,495, Cl. 135-65.000.

Boylan, Mark. Earphone cord take-up device. 4,942,617, Cl. 381-182.000.

Bradford, William M.; Silvern, Lloyd W.; and Dennis, Gerard A., to Motorola, Inc. Housing assembly having flexible shield and insulator. 4,942,380, Cl. 335-301.000.

Brandt, Inc.: *See*—
Winkler, Theodore, 4,941,655, Cl. 271-242.000.

Brasen, Daniel: *See*—
Bethea, Clyde G.; Brasen, Daniel; Levine, Barry F.; and Willens, Ronald H., 4,942,442, Cl. 357-29.000.

Brasher, Gary L.: *See*—
Kaiser, Roger A.; Nuckols, James H.; Emerson, Theodore F.; and Brasher, Gary L., 4,942,606, Cl. 380-4.000.

Brasilia Srl: *See*—
Zucchetti, Elia, 4,941,399, Cl. 99-289.00P.

Braun Aktiengesellschaft: *See*—
Wolf, Jurgen, 4,941,259, Cl. 30-34.100.

Braun, Hilarion, to Eastman Kodak Company. Bubble ink jet print head and cartridge construction and fabrication method. 4,942,408, Cl. 346-140.00R.

Brayman, Theron R.; Pasek, Eugene A.; and Wall, Gregory D., to Hickson Corporation. Method for fixing chromated copper arsenate treating agents in wood. 4,942,064, Cl. 427-297.000.

Breitwieser, Karl; and Kirchner, Wolfgang, to Alfred Teves GmbH. Arrangement for fastening a brake booster. 4,941,764, Cl. 403-24.000.

Bremer Strassenbahn AG: *See*—
Richter, Wolfgang-Dieter; Weeger, Engelbert; Uebel, Lutz; and Foerster, Erhard, 4,941,409, Cl. 105-157.100.

Bremus, Norbert: *See*—
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Sandbank, Charles P.; Childs, Ian; and Storey, Richard, 4,942,466, Cl. 358-133.000.

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Ozawa, Paul; Brooks, Mark; and Nakanata, Fumitoshi, 4,942,373, Cl. 333-161.000.

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Matsumoto, Yumio; Kimura, Yasuo; and Takagi, Osamu, 4,942,423, Cl. 355-30.000.
Nakai, Hitoshi; and Sakai, Toshio, 4,942,419, Cl. 355-27.000.
Ogawa, Hiroo; and Kawai, Takamitsu, 4,941,761, Cl. 400-124.000.
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Baumert, Heinz; Bruhnke, Ulrich; Greiner, Ferdinand; and Nothacker, Siegfried, 4,941,704, Cl. 296-97.110.

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Haisch, Bernhard M.; and Bruner, Marilyn E., 4,941,252, Cl. 29-261.000.

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Beranger, Herve ; Brunin, Armand; Caplier, Bruno; and Rousseau, Jean-Paul, 4,942,316, Cl. 307-455.000.

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Ammon, Robert L.; Buckman, Raymond W.; and Sabol, George P., 4,941,928, Cl. 148-2.000.

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Iseler, Kenneth A.; and Wilkinson, Robert E., 4,941,937, Cl. 156-274.800.
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Noschese, Rocco; and Lazar, Michael, 4,941,833, Cl. 439-92.000.

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Murray, Kenneth W., 4,942,550, Cl. 364-900.000.

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Buschmann, Ernst; Sproesser, Linhard; Zeeh, Bernd; Jung, Johann; Rademacher, Wilhelm; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, to BASF Aktiengesellschaft. Diastereomeric triazolyl glycol ethers-fungicides and growth regulators. 4,942,244, Cl. 548-268.200.

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Rudolf, Boris; and Gentischer, Josef, 4,941,292, Cl. 51-168.000.

C.M. Smillie & Company: *See*—
Smillie, Charles M., III, 4,941,797, Cl. 414-462.000.

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Felix, Augustus; and Uhoch, John, 4,941,872, Cl. 604-27.000.

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Goodlander, Theodore J.; Valdepenas, Jose M.; McCaskey, Ricardo E. V.; and Vizcaino, Gerardo, 4,942,579, Cl. 371-51.000.

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Westfall, Norman R., 4,941,285, Cl. 49-176.000.

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Dervan, Peter B.; and Hertzberg, Robert P., 4,942,227, Cl. 536-27.000.

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Capson, David W.; and Tsang, Randy, 4,941,256, Cl. 29-833.000.
Normandin, Richard J. F., 4,941,725, Cl. 350-96.130.

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Ikawa, Kazuo, 4,942,340, Cl. 315-241.00P.
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Kumagai, Motoo; Kato, Keiichi; Nagano, Masato; and Sakaguchi, Michiaki, 4,942,079, Cl. 428-209.000.
Sano, Masafumi, 4,942,058, Cl. 427-431.000.
Suzuki, Shoji, 4,942,600, Cl. 379-100.000.
Tada, Tatsuya, 4,942,431, Cl. 355-246.000.
Takai, Hideyuki; and Kanemaru, Tetsuro, 4,942,106, Cl. 430-72.000.
Taniguchi, Osamu; Kanbe, Junichiro; Okada, Shinjiro; Tsuboyama, Akira; and Enari, Masahiko, 4,941,736, Cl. 350-350.00S.
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Yoneda, Ko; Toda, Yasushi; Matsuda, Tooru; Makino, Kenji; and Nagata, Kenji, 4,942,489, Cl. 360-121.000.

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Charles, Harry R.; Cape, Thomas W.; and Miles, Donald L., 4,941,930, Cl. 148-260.000.

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Felle, Karl; and Krastel, Heinz, 4,942,415, Cl. 354-234.100.

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Sorenson, Richard W., 4,942,272, Cl. 200-43.160.

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Borgarello, Enrico; Carlini, Filippo M.; Neri, Carlo; and Platone, Edoardo, 4,942,179, Cl. 514-659.000.

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Anderson, Robert K.; Foster, Ruth E.; and Carlson, Bertyl W., 4,941,313, Cl. 54-24.000.

Carlson, John, to Teleflex Incorporated. Tilt wheel universal. 4,941,766, Cl. 403-131.000.

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Carpenter, James H., to Pangborn Corporation. Abrasive elevating apparatus for blast machines and method of using. 4,941,295, Cl. 51-425.000.

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Carroll, Terry: *See—*
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Wieringa, Tom, 4,941,493, Cl. 134-166.00R.

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Casida, John E.; Palmer, Christopher J.; Larkin, John P.; and Smith, Ian H., to University of California, The Regents of the. Pesticidal compounds. 4,942,173, Cl. 514-452.000.

Casio Computer Co., Ltd.: *See—*
Umeda, Osamu; Nakakusu, Tohru; Sato, Makoto; and Shimazaki, Tatsuo, 4,941,732, Cl. 350-128.000.

Cassinelli, Giuseppe; Grein, Arpad; Merli, Sergio; and Rivola, Giovanni, to Farmitalia Carlo Erba S.p.A. Biosynthetic anthracyclines related to daunorubicin. 4,942,155, Cl. 514-34.000.

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Castorani, Samuel J.: *See—*
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Sanderson, William A.; and King, David L., 4,942,218, Cl. 528-381.000.

Catanzaro, John C., to Cincinnati Milacron Inc. Method and apparatus for regulating mold clamping force in an injection molding machine. 4,942,004, Cl. 264-40.500.

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Weber, Robert L.; Kamman, Kenneth R.; Ballheimer, Benny; and Shoup, Stephen G., 4,941,440, Cl. 123-193.00P.

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Ducarroir, Michel R.; Male, Germain J.; Nadal, Marcel F.; Basse, Alain G.; Pizzini, Gerard P.; and Cazajous, Didier P., 4,942,062, Cl. 427-249.000.

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Ceisel, Stephen C.; Conrad, James F.; Lestan, Elizabeth M.; and Nelson, Allen P., to Amoco Corporation. Process for the continuous separation of maleic anhydride from process gases. 4,941,895, Cl. 55-84.000.

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Sasaki, Hiromi; Tanaka, Tadasi; and Muneno, Yasusi, 4,942,024, Cl. 423-65.000.

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Henderson, Graeme B.; Ulrich, Peter C.; and Cerami, Anthony, 4,942,170, Cl. 514-326.000.

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Anic, Jure; Dedericks, Walburga; Huybrechts, Lucas E. A.; and Johnson, Harry, 4,941,921, Cl. 106-213.000.

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Fluent, Stewart L.; Hart, Colin; McCree, Charles D.; and Lotsch, Charles F., 4,941,309, Cl. 53-544.000.

Chamberlin, William B., III; and Zalar, Frank V., to Lubrizol Corporation, The. Lubricating oil compositions and methods for lubricating gasoline-fueled and/or alcohol-fueled, spark-ignited engines. 4,941,984, Cl. 252-39.000.

Chambers, Charles W. Methods and apparatus for providing reciprocal impedance conversion. 4,942,603, Cl. 379-398.000.

Chang, Hsueh-Rong: *See—*
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Chapman, Fred A.: *See—*
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Fornasier, Roberto; Tornatore, Massimo; and Chapoy, L. Lowrence, 4,942,233, Cl. 544-212.000.

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Hansberry, Mitchell L., 4,941,417, Cl. 112-142.000.

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Horan, Gerald P.; Wickmann, John T.; and Olak, Richard C., 4,941,765, Cl. 403-107.000.

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Suzuki, Osamu; Ishiwata, Syousuke; Hayashi, Mitsuroh; and Oshima, Hideaki, 4,941,346, Cl. 73-54.000.

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Watanabe, Yoshio; and Chikama, Toshio, 4,941,455, Cl. 128-4.000.

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Kawata, Takashi; Katsumata, Hideo; Makino, Kenya; and Chikatsu, Yoshishige, 4,942,187, Cl. 523-200.000.

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Childers, Robert W.: *See—*
Sestak, Joseph T.; and Childers, Robert W., 4,941,519, Cl. 141-22.000.

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Sandbank, Charles P.; Childs, Ian; and Storey, Richard, 4,942,466, Cl. 358-133.000.

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Chiong, Kaolin N.: *See—*
Moreau, Wayne M.; Chiong, Kaolin N.; Chow, Ming-Fea; and Snyder, Nancy W., 4,942,108, Cl. 430-169.000.

Chiu, Kai F.: *See—*
Wendt, Greg A.; Underhill, Kimberly K.; Rugowski, James S.; Kressner, Bernhardt E.; and Chiu, Kai F., 4,942,077, Cl. 428-152.000.

Choi, Byoung-jin: *See—*
Park, Hak-song; Choi, Byoung-jin; and Oh, Heung-chul, 4,942,447, Cl. 357-42.000.

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Bowers, Robert B.; and Chookazian, Mark, 4,941,584, Cl. 220-5.00R.

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Moreau, Wayne M.; Chiong, Kaolin N.; Chow, Ming-Fea; and Snyder, Nancy W., 4,942,108, Cl. 430-169.000.

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Godin, Lawrence J., 4,941,672, Cl. 280-91.000.

Chubb, Charles F.: *See—*
DiMatteo, Paul; Chubb, Charles F.; and Segnini, Robert, 4,941,220, Cl. 5-81.00R.

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Chum, Helena L.; and Black, Stuart K., to Midwest Research Institute. Process for fractionating fast-pyrolysis oils, and products derived therefrom. 4,942,269, Cl. 585-240.000.

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Decher, Gero; and Tieke, Bernd, 4,941,997, Cl. 252-586.000.
Rytz, Gerhard; and Slongo, Mario, 4,942,238, Cl. 546-242.000.

Cigana, Fiorenzo: *See*—
Ardit, Giuseppe; Cigana, Fiorenzo; and Magris, Renzo, 4,942,346, Cl. 318-280.000.

Cimenti, Antonio. Juice extractor machines for fruit and vegetables. 4,941,403, Cl. 99-492.000.

Cimenti, Giovanni; Lonardi, Emile; and Mailliet, Pierre, to Paul Wurth S.A. Handling device for a distribution chute of a shaft furnace and drive mechanism suitable for this device. 4,941,792, Cl. 414-208.000.

Cincinnati Milacron Inc.: *See*—
Catanzaro, John C., 4,942,004, Cl. 264-40.500.

CIPEL: *See*—
Audebert, Jean F.; and Mauchaussee, Daniel, 4,942,101, Cl. 429-165.000.

Citizen Watch Co., Ltd.: *See*—
Ishida, Yoshihiro; Iinuma, Yoshio; and Ichikawa, Shingo, 4,942,453, Cl. 357-68.000.
Miyajima, Akira; Shiraishi, Atushi; and Yoshida, Yasuyuki, 4,942,458, Cl. 358-29.000.

Claar, Klaus-Peter: *See*—
Lindmayer, Martin; Kneib, Rudi; Weikert, Gunther; Schneider, Wolfgang; Krugener, Rolf; and Claar, Klaus-Peter, 4,941,569, Cl. 206-38.100.

Clapp, William L.; and Fagg, Barry S., to R. J. Reynolds Tobacco Company. Tobacco processing. 4,941,484, Cl. 131-297.000.

Clapper, Dennis K.: *See*—
Perricone, Alphonse C.; Clapper, Dennis K.; and Enright, Dorothy P., 4,941,981, Cl. 252-8.510.

Clardy, Jon: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,942,247, Cl. 548-505.000.

Clark, David F., to Anderson, Allison E. Slide fasteners and the like. 4,941,238, Cl. 24-437.000.

Clark, Paul B.: *See*—
Cenegy, Lawrence M.; Deal, Samuel G.; Cooley, Max E.; and Clark, Paul B., 4,941,917, Cl. 75-744.000.

Clarke, David: *See*—
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,942,117, Cl. 430-558.000.
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,942,118, Cl. 430-558.000.

Clausen, Henrik, to Biomembrane Institute, The. A-associated H-antigens, monoclonal antibodies specific thereto and methods for employing the same in blood typing. 4,942,224, Cl. 530-387.000.

Clem, Richard R.: *See*—
Busack, Jon P.; Johnson, Gary M.; and Clem, Richard R., 4,942,576, Cl. 371-21.200.

Cleveland, Lester G., to Allied-Signal Inc. Method for assembling an annular shear accelerometer. 4,941,243, Cl. 29-25.350.

Coates, Jacqueline A.; Farrar, John M.; and Graham, Margaret H., all of, to Sandoz Ltd. Fluid loss-reducing additives for oil-based well working fluids. 4,941,983, Cl. 252-8.515.

Coating Development Societe Anonyme: *See*—
Ducarroir, Michel R.; Male, Germain J.; Nadal, Marcel F.; Basse, Alain G.; Pizzini, Gerard P.; and Cazajous, Didier P., 4,942,062, Cl. 427-249.000.

Cognard, Patrice: *See*—
Bouchez, Alain; Cognard, Patrice; Marie, Gerard; and Schmidt, Alain, 4,941,749, Cl. 366-147.000.
Bouchez, Alain; Cognard, Patrice; Gearard, Marie; and Schmidt, Alain, 4,941,750, Cl. 366-147.000.

Cohen, Noal, to Hoffmann-La Roche Inc. Process for producing vitamin E. 4,942,249, Cl. 549-407.000.

Cok, Ronald S., to Eastman Kodak Company. Enhanced input/output architecture for toroidally-connected distributed-memory parallel computers. 4,942,517, Cl. 364-200.000.

Colbourne, Paul D., to Focal Technologies Incorporated. Fibre optic sensor for the continuous measurement liquids level and other parameters. 4,942,306, Cl. 250-577.000.

Coldren, Bruce E.: *See*—
McGee, H. Dean; Krause, Kenneth W.; and Coldren, Bruce E., 4,942,539, Cl. 364-513.000.

Color Ident Systems Corporation: *See*—
Fuerstman, Leland L., 4,941,573, Cl. 206-459.000.

Colson Castors (Europe) Limited: *See*—
Screen, Stafford T., 4,941,552, Cl. 188-1.120.

Colt Industries Inc.: *See*—
Mannhardt, Werner G., 4,941,447, Cl. 123-455.000.

Combustion Engineering, Inc.: *See*—
Sapia, Mark A., 4,942,545, Cl. 364-571.010.

Comer, John, to Victoria University of Manchester, The. Electron spectrometer. 4,942,298, Cl. 250-305.000.

Commissariat a l'Energie Atomique: *See*—
Rambaut, Michel, 4,942,546, Cl. 364-574.000.

Compagnie de Raffinage et de Distribution: *See*—
Pauly, Jean-Francois; and Rousel, Gerard, 4,942,133, Cl. 436-125.000.

Compagnie Europeenne Du Zirconium Cezus: *See*—
Boutin, Jean; Brun, Pierre; and Lamaze, Airy-Pierre, 4,941,916, Cl. 75-10.120.

Compaq Computer Corporation: *See*—
Kaiser, Roger A.; Nuckols, James H.; Emerson, Theodore F.; and Brasher, Gary L., 4,942,606, Cl. 380-4.000.

Condo, Antonino; and Ferrario, Renzo, to Ausimont S.p.A. Process for the manufacture of granular monohydrated sodium perborate. 4,942,025, Cl. 423-282.000.

Conley, Edward V.: *See*—
Santhanam, Anakkavur T.; and Conley, Edward V., 4,942,097, Cl. 428-552.000.

Conrad, James F.: *See*—
Ceisel, Stephen C.; Conrad, James F.; Lestan, Elizabeth M.; and Nelson, Allen P., 4,941,895, Cl. 55-84.000.

Consulier Industries, Inc.: *See*—
Shaffer, James, 4,941,787, Cl. 411-136.000.

Conti-Ramsden, John N.; Head, Robert A.; Powell, Richard L.; and Young, Brian D., to Imperial Chemical Industries PlC. Polymer compositions. 4,942,203, Cl. 525-185.000.

Continental Can Company, Inc.: *See*—
Pfaffmann, George D.; Balzer, Norbert R.; Kubis, Charles S.; Walter, John; Currie, John P.; and Adams, Graham R., 4,941,306, Cl. 53-306.000.

Converse Inc.: *See*—
Gross, Theodore S., 4,941,273, Cl. 36-114.000.

Convex Computer Corporation: *See*—
Weatherford, James R.; Kimmel, Arthur T.; and Wallach, Steven J., 4,942,518, Cl. 364-200.000.

Conzelmann, Gerhard; Nagel, Karl; and Fiedler, Gerhard, to Robert Bosch GmbH. Power transistor monolithic integrated structure. 4,942,308, Cl. 307-202.100.

Cook, Kenneth J., to GTE Valenite Corporation. Adjustable boring bar. 4,941,782, Cl. 408-147.000.

Cooley, Max E.: *See*—
Cenegy, Lawrence M.; Deal, Samuel G.; Cooley, Max E.; and Clark, Paul B., 4,941,917, Cl. 75-744.000.

Cooper, Frank W., Jr.: *See*—
Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., 4,941,577, Cl. 211-70.600.

Corbett, Peter F.: *See*—
Hartley, Richard I.; Corbett, Peter F.; Yassa, Fathy F.; and Noujaim, Sharbel E., 4,942,396, Cl. 341-101.000.

Cordes, Harry, to Pall Corporation. Apparatus and method for gas-liquid separation and filtration. 4,941,900, Cl. 55-319.000.

Cordis Corporation: *See*—
Montano, Fausto, Jr., 4,941,877, Cl. 604-96.000.

Cornelissen, Jan, to Pielkenrood Vinitex B.V. Cross-flow separator for separating component suspended in a liquid. 4,941,977, Cl. 210-521.000.

Cornell Research Foundation, Inc.: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,942,247, Cl. 548-505.000.

Corning Incorporated: *See*—
Schmitt, Paul S., 4,941,906, Cl. 65-29.000.

Corsi, Paul J.; Engdahl, Lawrence W.; and Klas, Daniel E., to Hubbell Incorporated. Hinged plastic duct for conduit. 4,942,271, Cl. 174-101.000.

Cortese, Thomas F. Repair of edge defects in boards of lumber or the like. 4,941,305, Cl. 52-514.000.

Corti, Dario. Catamaran boat structure. 4,941,419, Cl. 114-61.000.

Costa, Larry J., to Valmont Industries, Inc. Terminal for ballast bobbin. 4,941,852, Cl. 439-733.000.

Cote, Denis: *See*—
Cournoyer, Andre; Berard, Serge; and Cote, Denis, 4,941,331, Cl. 66-25.000.

Couden, Donald V.; Karr, Paul C.; and Balliet, Layton, to International Business Machines Corporation. Optical fiber connection utilizing photodiode means. 4,941,724, Cl. 350-96.180.

Couls, Donald E.; and Love, William J. Pegboard hook retaining clip. 4,941,632, Cl. 248-221.200.

Coult, John H.: *See*—
Adler, Robert; Coult, John H.; and Strauss, Paul, 4,942,332, Cl. 313-402.000.

Cournoyer, Andre; Berard, Serge; and Cote, Denis, to Sport Maska Inc. Method of producing double knit fabric with holes therethrough and knitted color bands. 4,941,331, Cl. 66-25.000.

Craig, Donald B.; and McCluhan, Thomas K., to Elkem Metals Company. Desulfurization agent. 4,941,914, Cl. 75-309.000.

Crane & Co.: *See*—
Crane, Timothy T., 4,941,687, Cl. 283-91.000.

Crane, Timothy T., to Crane & Co. Security paper for currency and bank notes. 4,941,687, Cl. 283-91.000.

Creamer, John J.; and Muller, John. Insulated backpack. 4,941,603, Cl. 224-148.000.

Cripps, Peter K.: *See*—
Nease, Greg A.; and Cripps, Peter K., 4,942,591, Cl. 375-84.000.

Crisler, Kenneth J.: *See*—
Kotzin, Michael D.; Crisler, Kenneth J.; Mohl, Lawrence M.; Saltzberg, Theodore; Hong, Daehyoung; and Van den Heuvel, Anthony P., 4,942,570, Cl. 370-80.000.

Crockett, Bruce L.: *See*—
Merrill, Richard A.; Crockett, Bruce L.; and Strader, Robert C., 4,942,552, Cl. 364-900.000.

Crowe, Lawrence E., to Sundstrand Corporation. Enhanced air fin cooling arrangement for a hermetically sealed modular electronic cold plate utilizing reflux cooling. 4,941,530, Cl. 165-104.330.

CTI Industries, Inc.: *See*—
McParland, Kevin W., 4,941,512, Cl. 138-97.000.

Cunningham, Patricia H.: *See*—
Newman, Paul R.; and Cunningham, Patricia H., 4,942,078, Cl. 428-192.000.

Currie, John P.: *See*—
Pfaffmann, George D.; Balzer, Norbert R.; Kubis, Charles S.; Walter, John; Currie, John P.; and Adams, Graham R., 4,941,306, Cl. 53-306.000.

Curry, William J., to U-Haul International. Truck ramp storage system. 4,941,703, Cl. 296-37.600.

Curtice-Burns, Inc.: *See*—
Winter, Daryl B.; Meyer, Richard S.; Root, Jeffrey M.; and Campbell, Michael L., 4,942,054, Cl. 426-611.000.

Cutler, William, to AMG Resources Corporation. Method of shredding cans. 4,941,619, Cl. 241-22.000.

CVD Incorporated: *See*—
Hui, Benjamin C.; and Lorberth, Jorg, 4,942,252, Cl. 556-70.000.

Cycle Products Company: *See*—
Specht, Brian; and Ippolito, Robert, 4,941,369, Cl. 74-551.900.

Czaban, John D.: *See*—
Qureshi, Humayun; Liffmann, Stanley M.; and Czaban, John D., 4,941,808, Cl. 417-415.000.

Dadgar, Ahmad; and Shin, Charles C., to Great Lakes Chemical Corporation. Calcium-free clear high density fluids. 4,941,982, Cl. 252-8.551.

Dai, Pei-Shing E.; Sherwood, David E., Jr.; Bartley, Burton H.; and Petty, Randall H., to Texaco Inc. Hydrotreatment process employing catalyst with specified pore size distribution. 4,941,964, Cl. 208-216.0PP.

Daicel Chemical Industries: *See*—
Shinbo, Toshio; Yamaguchi, Tomohiko; and Tachibana, Kouzou, 4,942,149, Cl. 502-401.000.

Daido Metal Company, Ltd.: *See*—
Mori, Sanae; Sasaki, Takayosi; and Ozika, Takehiro, 4,941,269, Cl. 33-783.000.

Daifuku Co., Ltd.: *See*—
Iijima, Takashi; Matsui, Takeshi; Kaneto, Shigeru; Horio, Kenji; and Kato, Toshihiko, 4,941,347, Cl. 73-116.000.

Daiichi Seiyaku Co., Ltd.: *See*—
Masumura, Hidemi; Sakuma, Kyoko; and Ashida, Shinichiro, 4,942,171, Cl. 514-399.000.

Daikin Industries, Ltd.: *See*—
Ohmori, Akira; and Yasuhara, Takashi, 4,942,205, Cl. 525-326.200.

Daimler-Benz AG: *See*—
Baumann, Karl-Heinz; Holtze, Herbert; Wunsche, Martin; and Schwede, Wolfgang, 4,941,679, Cl. 280-775.000.
Baumert, Heinz; Brukake, Ulrich; Greiner, Ferdinand; and Nothacker, Siegfried, 4,941,704, Cl. 296-97.110.
Lindmayer, Martin; Kneib, Rudi; Weikert, Gunther; Schneider, Wolfgang; Krugener, Rolf; and Claar, Klaus-Peter, 4,941,569, Cl. 206-38.100.
Ohrle, Rolf; and Herlemann, Werner, 4,941,707, Cl. 296-216.000.
Reiner, Klaus; Rieker, Heinz; and Stoll, Josef, 4,941,365, Cl. 73-865.000.

Dainichiseika Color & Chemicals Mfg. Co., Ltd.: *See*—
Hasada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 4,942,212, Cl. 528-28.000.

Dainippon Screen Mfg. Co., Ltd.: *See*—
Inagaki, Yukihiko; Masuda, Yoshikazu; Sasada, Shigeru; Katsuyama, Mikizo; and Tanaka, Hirohisa, 4,942,460, Cl. 358-75.000.
Sasada, Shigeru, 4,941,723, Cl. 350-96.100.
Yamakawa, Shinji, 4,942,542, Cl. 364-523.000.
Yoshimi, Yasuhito, 4,942,416, Cl. 354-299.000.

Dakin, John P., to Plessey Overseas Limited. Optical sensing arrangements. 4,941,747, Cl. 356-346.000.

Dallas Semiconductor Corporation: *See*—
Whiteside, Frank A.; and Smith, Michael D., 4,942,593, Cl. 375-118.000.

Dallmann, Hermann: *See*—
Gribbin, John D.; Dallmann, Hermann; Engel, Dieter; and Hensel, Hartmut, 4,942,088, Cl. 428-336.000.

Dalrymple, Monte J.; and Brubaker, Lois F., to Zilog, Inc. System for providing notification of impending FIFO overruns and underruns. 4,942,553, Cl. 364-900.000.

Dalrymple, Thomas H.; and Zagrocki, Richard L., to Union Tank Car Company. Outlet valve assembly with an extended handle for a railway tank car. 4,941,410, Cl. 105-358.000.

D'Alterio, Joseph C. Apparatus for encapsulating filler with dough. 4,941,402, Cl. 99-450.600.

D'Amico, Ben A. Ostomy plug-pouch. 4,941,869, Cl. 600-32.000.

Dan Science Co., Ltd.: *See*—
Kamimura, Yasuo; Ohmori, Toshiaki; Yanagi, Motonori; Fukumoto, Takaaki; and Hama, Masaharu, 4,941,489, Cl. 134-95.000.

Dana Corporation: *See*—
Flotow, Richard A.; and Dickson, Thomas G., 4,941,557, Cl. 192-70.250.
Hennessy, David R.; and Wenker, Dennis H., 4,941,508, Cl. 137-625.690.

Danfoss A/S: *See*—
Kirkelund, Poul; and Klausen, Jorn H., 4,941,505, Cl. 137-563.000.

Danieli & C. Officine Meccaniche SpA and CEDA SpA Costruzioni Elettromeccaniche e Dispositivi d'Automazione: *See*—
Da Rio, Luciano; and Bini, Giovanni, 4,942,543, Cl. 364-550.000.

Darby, William M.: *See*—
Misch, Donald W.; Hagadorn, Irvine R., deceased; Higgins, Thomas D., III, legal representative; Darby, William M.; and Swanson, Murray S., 4,941,631, Cl. 248-178.000.

Darden, Julius C.; Praca, Miguel M.; and Tomasi, Philip J. Adapter and a removable slide-in cartridge for an information storage system. 4,941,841, Cl. 439-377.000.

Da Rio, Luciano; and Bini, Giovanni, to Danieli & C. Officine Meccaniche SpA and CEDA SpA Costruzioni Elettromeccaniche e Dispositivi d'Automazione. Method for regulating the pull in continuous rolling trains and rolling train which adopts said method. 4,942,543, Cl. 364-550.000.

da Silva Antunes, Eloy, to Seiwert Stahl- und Apparatebau GmbH. Electric monorail conveyor. 4,941,555, Cl. 191-14.000.

Da-Tan, Liou; and Shiou-Huey, Chang. Fire escape apparatus. 4,941,549, Cl. 182-234.000.

Dataproducts Corporation: *See*—
Helms, Cliff, 4,941,405, Cl. 101-93.040.

Daugulis, Andrew J.: *See*—
Goosen, Matheus F. A.; King, Glenn A.; Daugulis, Andrew J.; and Faulkner, Peter, 4,942,129, Cl. 435-182.000.

Davies, John H.: *See*—
Marlowe, Mickey O.; Rosenbaum, Herman S.; Rowland, Trevor C.; Patterson, Charles B., Jr.; and Davies, John H., 4,942,016, Cl. 376-418.000.

Davies, Jon H.: *See*—
Forschirm, Alex S.; and Davies, Jon H., 4,942,208, Cl. 525-414.000.

Davies, Michael L.; and Weber, Lawrence, to Unisys Corp. Sheet handling mechanism. 4,941,656, Cl. 271-278.000.

Davis, Allen V. C. Method for producing a motion transmitting and amplifying device. 4,941,254, Cl. 29-622.000.

Davis, Bill E.: *See*—
Stewart, G. Wayne; Davis, Bill E.; Thomas, William M.; Dobie, Michael J.; and Bacigalupe, Carlos, 4,941,819, Cl. 432-8.000.

Davis, Gregory A.; and Spangler, Harold L., to Motorola, Inc. Integrated circuit option identification circuit and method. 4,942,358, Cl. 324-158.00R.

Davis, Jon A.: *See*—
Amboss, Kurt; and Davis, Jon A., 4,942,336, Cl. 315-3.500.

Davis, Walter L., to Motorola, Inc. Telephone answering machine in paging systems with automatic number identification based message operations. 4,942,598, Cl. 379-57.000.

Dayton Extruded Plastics, Inc.: *See*—
Morton, Philip G., 4,941,288, Cl. 49-504.000.

Deal, Samuel G.: *See*—
Cenegy, Lawrence M.; Deal, Samuel G.; Cooley, Max E.; and Clark, Paul B., 4,941,917, Cl. 75-744.000.

DeBoer, Charles D.; and Evans, Steven, to Eastman Kodak Company. Infrared absorbing squarylium dyes for dye-donor element used in laser-induced thermal dye transfer. 4,942,141, Cl. 503-227.000.

de Boer, Jan: *See*—
Hamersma, Wilhelmus Jozefus L. A.; de Boer, Jan; Roovers, Wilhelmus M. M.; and de Wit, Gerrit, 4,942,188, Cl. 523-212.000.

De Boer, Johannes; and Troster, Manfred, to FAG Kugelfischer Georg Schafer (KGaA). Stop screw with drop-in ball. 4,941,368, Cl. 74-527.000.

DeCamp, Ann E.; Volante, Ralph P.; King, Anthony O.; and Shinkai, Ichiro, to Merck & Co., Inc. Process for certain (2R-trans)hexahydroaroquinolizines. 4,942,235, Cl. 546-18.000.

DeCesare, Dominic. Two pole electric motor with stator winding encircling the rotor. 4,942,323, Cl. 310-208.000.

Decher, Gero; and Tieke, Bernd, to Ciba-Geigy Corporation. Amphiphilic azo dyes and molecular aggregates thereof. 4,941,997, Cl. 252-586.000.

Decker, Richard B.; and Hummel, Joseph, to Bettcher Industries, Inc. Slip resistant, cushioning cover for handles. 4,941,232, Cl. 16-111.00R.

Dederichs, Walburga: *See*—
Anic, Jure; Dederichs, Walburga; Huybrechts, Lucas E. A.; and Johnson, Harry, 4,941,921, Cl. 106-213.000.

Deere & Company: *See*—
Ardueser, William A.; Rumph, George W.; and Anstey, Henry D., 4,941,311, Cl. 53-587.000.

De Felice, Wilfried: *See*—
Sandow, Jurgen K.; De Felice, Wilfried; Pajunk, Horst; and Pajunk, Heinrich, 4,941,874, Cl. 604-60.000.

Deffner, Dieter: *See*—
Roesky, Werner; Deffner, Dieter; and Wolter, Manfred, 4,941,772, Cl. 405-128.000.

De Filippi, Quinto. Front loading refuse vehicle. 4,941,796, Cl. 414-409.000.

Deguchi, Masaharu: *See*—
Hisada, Takanori; Maruyama, Takesuke; Deguchi, Masaharu; Noro, Yoshihiko; Honma, Yoshifumi; Ariki, Yoshio; and Taguchi, Shunichi, 4,941,719, Cl. 350-6.800.

Dei, Akira: *See—*
Nasu, Yasunobu; Ogishima, Taichi; Dei, Akira; Uchida, Haruhiko; Inami, Mitsuru; Furuhashi, Tatsuo; Hino, Yasuhiko; and Sugimura, Hideo, 4,942,048, Cl. 426-271.000.

Dei, Yoshito: *See—*
Sampei, Keiichi; Kawasaki, Masami; Dei, Yoshito; Fukumoto, Katsumi; and Furukawa, Kazuo, 4,941,863, Cl. 474-33.000.

Deki, Shigehito: *See—*
Noguchi, Toru; Takada, Toshimichi; Yonezaki, Takahiro; Yamaguchi, Yoshio; Kakiuchi, Hajime; Deki, Shigehito; Goto, Kazuo; Miyata, Hitoshi; and Mashimo, Satoshi, 4,941,961, Cl. 204-294.000.

De Leeuw, Dagobert M.: *See—*
Mutsaers, Cornelis A. H. A.; De Leeuw, Dagobert M.; Klaassen, Dirk B. M.; and Ronda, Cornelis R., 4,942,335, Cl. 313-468.000.

DeLeo, John. Universal high voltage ground stud insulating system. 4,941,834, Cl. 439-92.000.

Delta Concept S.A.: *See—*
Cambien, Jean C., 4,942,381, Cl. 337-370.000.

Den norske stats oljeselskap a.s: *See—*
Johansen, Trond V.; Ruch, Ola; Naess, Ludvig; Kristjansson, K. P.; and Utengen, S. F., 4,941,511, Cl. 138-89.000.

Denk, Joseph: *See—*
Raybould, Derek; Fish, Gordon E.; and Denk, Joseph, 4,942,322, Cl. 310-156.000.

Dennis, Gerard A.: *See—*
Bradford, William M.; Silvern, Lloyd W.; and Dennis, Gerard A., 4,942,380, Cl. 335-301.000.

Dennison Manufacturing Company: *See—*
Fitch, John J.; and Parker, Tim, 4,942,410, Cl. 346-160.100.
Kelley, Gary L., 4,941,654, Cl. 271-209.000.

Denz, Helmut; Moz, Rudolf; and Uttenweiler, Winfried, to Robert Bosch GmbH. Ignition and fuel injection back-up system for emergency running of internal combustion engines. 4,941,446, Cl. 123-414.000.

Denzler, Karl; Bohm, Alfred; and Wirth, Alfred, to Liba Maschinenfabrik GmbH. Beam warping machine with a device for the maintenance of required yarn tension. 4,941,240, Cl. 28-187.000.

DePerna, James. Baseball game. 4,941,662, Cl. 273-25.000.

Dervan, Peter B.; and Hertzberg, Robert P., to California Institute of Technology. Bifunctional molecules having a DNA intercalator or DNA groove binder linked to ethylene diamine tetraacetic acid, their preparation and use to cleave DNA. 4,942,227, Cl. 536-27.000.

De Schepper, Achille J.; Haesebroek, Guy G.; and Van Peteghem, Antoine L., to Metallurgie Hoboken-Overpelt. Metal extraction process with substituted 8-hydroxyquinoline. 4,942,023, Cl. 423-22.000.

DeSoto, Inc.: *See—*
Murphy, Edward J.; Ansel, Robert E.; and Krajewski, John J., 4,942,001, Cl. 264-22.000.

Desowag Materialschutz GmbH: *See—*
Pallaske, Michael, 4,941,356, Cl. 73-587.000.

Deutsch, Howard M.: *See—*
Haugwitz, Rudiger D.; Zalkow, Leon; Glinski, Jan; Suffness, Mathew; Deutsch, Howard M.; and Narayanan, Venkatachala, 4,942,184, Cl. 514-449.000.

Deutsch, Robert W., to Motorola, Inc. Electronic position sensor assembly and engine control system. 4,941,445, Cl. 123-414.000.

Deutsche Gesellschaft fur Wiederaufarbeitung von Kernbrennstoffen mbH: *See—*
Eiben, Klaus; and Evers, Heinz, 4,941,998, Cl. 252-627.000.

Deutsche Thomson-Brandt GmbH: *See—*
Keesen, Heinz-Werner; and Perdrieau, Laurent, 4,942,457, Cl. 358-12.000.
Schroder, Ernst; and Voessing, Walter, 4,942,607, Cl. 381-31.000.

Deveaud, Vincent: *See—*
Peres, Philippe; and Deveaud, Vincent, 4,942,495, Cl. 361-220.000.

Devening, Charles K. High density storage system. 4,941,578, Cl. 211-186.000.

Devitt, Francis E.; Doran, John P.; and Gaughan, Kevin J., to Moog Ltd. Control system for brushless motors. 4,942,344, Cl. 318-254.000.

de Wit, Gerrit: *See—*
Hamersma, Wilhelmus Jozefus L. A.; de Boer, Jan; Roovers, Wilhelmus M. M.; and de Wit, Gerrit, 4,942,188, Cl. 523-212.000.

Dewitz, Thomas S.; Salter, James A.; McCusker, James J.; Scott, Andrew M.; and Dirkse, Hendricus A., to Shell Oil Company. Compartmented gas injection device. 4,941,779, Cl. 406-138.000.

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Dickson, Thomas G.: *See—*
Flotow, Richard A.; and Dickson, Thomas G., 4,941,557, Cl. 192-70.250.

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Iio, Masahiro; Suzuki, Yoshio; Takayama, Hidehiko; and Sakamoto, Katsumi, 4,941,810, Cl. 418-15.000.
Li, Xin-he, 4,941,612, Cl. 239-88.000.

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Smith, Benjamin A.; and Hoback, Conaway K., 4,942,604, Cl. 379-412.000.

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Bolt, John D.; Dinh, Steven M.; and Silverman, Lee A., 4,942,011, Cl. 264-29.200.

Director-General of Agency of Industrial Science and Technology: *See—*
Shinbo, Toshio; Yamaguchi, Tomohiko; and Tachibana, Kouzou, 4,942,149, Cl. 502-401.000.

Dirkse, Hendricus A.: *See—*
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DLMA Transportation Inc.: *See—*
Ewen, James G., 4,941,543, Cl. 180-254.000.

Do, Phuc K.; Kellam, Karen K.; Tong, Ronnie Chi-on; Willis, Ronald W.; and Wyke, Carol E., to International Business Machines Corporation. Method and apparatus for generating a character image. 4,942,390, Cl. 340-735.000.

Dobie, Michael J.: *See—*
Stewart, G. Wayne; Davis, Bill E.; Thomas, William M.; Dobie, Michael J.; and Bacigalupe, Carlos, 4,941,819, Cl. 432-8.000.

Dr. Ing. h.c.F. Porsche AG: *See—*
Beer, Michael; Schimko, Philipp; Hofbauer, August; and Kroner, Matthias, 4,941,436, Cl. 123-41.770.
Fischle, Rudiger; and von Broock, Ulrich, 4,941,544, Cl. 180-292.000.

Dodd, Richard E.; and Baldwin, William C., to North American Dynamics. Loading apparatus for ammunition. 4,941,393, Cl. 89-35.010.

Dody, Jospeh W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., to Hewlett-Packard Company. Light emitting diode print head assembly. 4,942,405, Cl. 346-107.00R.

Doemens, Guenter; and Gilch, Markus, to Siemens Aktiengesellschaft. Sensor for measurement of the torque acting on a rotating shaft. 4,941,363, Cl. 73-862.330.

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Domingues, Louis P.: *See—*
Negas, Taki; and Domingues, Louis P., 4,942,146, Cl. 501-134.000.

Doran, John P.: *See—*
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Steinwandel, Juergen; Hauser, Manfred; and Hoeschele, Joerg, 4,942,057, Cl. 427-38.000.

Dorsch, Norman: *See—*
Sommer, Oswin; Dorsch, Norman; Bosch, Erhard; and Kurz, Alfred, 4,942,211, Cl. 528-14.000.

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Waraksa, Thomas J.; Fraley, Keith D.; Kiefer, Richard E.; Douglas, Daniel G.; and Gilbert, Lee H., 4,942,393, Cl. 340-825.720.

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Dow Corning Corporation: *See—*
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Dowzall, Martin E.; and Houssian, Vazgen J. Formulating pasty materials. 4,941,520, Cl. 141-114.000.

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Karol, Frederick J.; Sun-Chueh, Kao; and Drage, James S., 4,942,147, Cl. 502-113.000.

Dragerwerk Aktiengesellschaft: *See—*
Schrader, Bernhard; Heinrich, Petra; and Wyzgol, Raimund, 4,941,742, Cl. 356-38.000.

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Dressler, Max B.: *See—*
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Dril-Quip, Inc.: *See—*
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Dube, Michael F.; and Saintsing, Barry L. Cigarette having sidestream aroma. 4,941,486, Cl. 131-365.000.

Ducarroir, Michel R.; Male, Germain J.; Nadal, Marcel F.; Basse, Alain G.; Pizzini, Gerard P.; and Cazajous, Didier P., to Coating Development Societe Anonyme. Process for producing boron carbide coatings of controlled hardness. 4,942,062, Cl. 427-249.000.

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Duerr, Lorenz K. E.: *See—*
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Dunlap, Bobby D.: *See—*
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Du Pont de Nemours, E. I., and Company: *See—*
Becker, James Y., 4,941,954, Cl. 204-59.00R.
Behrens, Carl H., 4,942,163, Cl. 514-254.000.
Bolt, John D.; Dinh, Steven M.; and Silverman, Lee A., 4,942,011, Cl. 264-29.200.
Fan, Roxy N.; and Grossa, Mario, 4,942,066, Cl. 427-54.100.
Flexman, Edmund A.; and Sosnowski, James J., 4,942,200, Cl. 525-66.000.
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Gregory, Walter A.; and Kezar, Hollis S., III, 4,942,183, Cl. 514-376.000.
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Keys, Dalen E.; Smothers, William K.; and Harrington, Albert F., 4,942,102, Cl. 430-1.000.
Monroe, Bruce M.; and Smothers, William K., 4,942,112, Cl. 430-282.000.
Samelson, Harry V., 4,941,812, Cl. 425-131.500.
Tecle, Berhan, 4,941,929, Cl. 148-24.000.
Durette, Philippe L.; Ponpipom, Mitree M.; and Hagmann, William K., to Merck & Co., Inc. Steroidal glycolipids as host resistance stimulators against viral infection. 4,942,154, Cl. 514-26.000.
Durow, Kenneth M., to United Kingdom Atomic Energy Authority. Nuclear fuel pin fabrication. 4,942,014, Cl. 376-261.000.
Durr, Manfred; Unland, Georg; Rother, Wolfgang; Driemeier, Gunter; and Schmits, Heinz-Herbert, to Krupp Polysius AG. Method and apparatus for the heat treatment of fine-grained material. 4,941,821, Cl. 432-106.000.
Duvall, Ronald N.; and Gold, Gerald, to Miles Inc. Effervescent analgesic antacid composition having reduced sodium content. 4,942,039, Cl. 424-466.000.
Duvdevani, Ilan: *See—*
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Earnshaw, William E.; Howell, Jay; and Ripy, Paul B., to Modular Computer Systems, Inc. Error connection device for parity protected memory systems. 4,942,575, Cl. 371-10.100.
Easco Hand Tools, Inc.: *See—*
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Eastman Kodak: *See—*
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Eastman Kodak Company: *See—*
Bigelow, Donald O.; and Palone, Thomas W., 4,941,606, Cl. 226-118.000.
Braun, Hilarion, 4,942,408, Cl. 346-140.00R.
Bull, David N., 4,941,255, Cl. 29-833.000.
Chang, Win-Chyi, 4,942,357, Cl. 324-158.00R.
Cok, Ronald S., 4,942,517, Cl. 364-200.000.
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Hall, David F., 4,941,757, Cl. 384-473.000.
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Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,942,118, Cl. 430-558.000.
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Ebaugh, Paul L.: *See—*
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Ehmig, Gerhard; Jochum, Peter; and Maurer, Erich, to Hilti Aktiengesellschaft. Driving piston braking means for explosive powder actuated setting device. 4,941,391, Cl. 89-1.140.
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Ekco/Glaco Inc.: *See—*
Hare, Wilbert K.; Kaufman, Morris; and Morozuk, William M., 4,941,585, Cl. 220-23.200.
Ekhoff, Donald L. Flexible rocking mount with forward pivot for polishing pad. 4,941,293, Cl. 51-168.000.
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Electricite de France (Service National): *See—*
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Electronic Instrument & Specialty Corp.: *See—*
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Elford, Howard L.: *See—*
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Elkem Metals Company: *See—*
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Ellingen, David R.; Michalski, Steven E.; Mieczkowski, Daniel; and Pacetti, Larry D., to Snap-on Tools Corporation. Modular electronic device. 4,942,356, Cl. 324-156.000.
Ellingsen, Svein, to Paccar Inc. Four-wheel steerable vehicle having a fore/aft sliding link. 4,941,671, Cl. 280-91.000.
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., to AT&T Bell Laboratories. Component insertion machine apparatus. 4,941,795, Cl. 414-403.000.
Ellwanger, Phillip. Quick connect retaining leash. 4,941,434, Cl. 119-109.000.
Elton, Raymond C., to United States of America, Navy. X-ray laser with enhanced x-ray gain through photodepopulation. 4,942,580, Cl. 372-5.000.
Emard, Michael J. Knockdown canopy shelter. 4,941,500, Cl. 135-106.000.
Emerson Electric Co.: *See—*
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Emerson, Theodore F.: *See—*
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Emhart Industries, Inc.: *See—*
Mergell, Bruno, 4,942,283, Cl. 219-98.000.
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Law, Tony Y. M., 4,941,262, Cl. 30-419.000.
Enari, Masahiko: *See—*
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Endo, Hideki: *See—*
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Endo, Hiroshi: *See—*
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Engel, Harold J. Computer controlled viscous material deposition apparatus. 4,941,428, Cl. 118-680.000.

Engel, Hartmut S., to Ernst Fischer GmbH & Co. Modular working table. 4,941,412, Cl. 108-156.000.

Englert, Heinrich C.; Hropot, Max; Lang, Hans-Jochen; and Greger, Rainer, to Hoechst Aktiengellschaft. N-substituted aminoalkanoic acids, a process for their preparation, their use and pharmaceutical products based on these compounds. 4,942,176, Cl. 514-539.000.

English, Russell R.: *See*—
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Borgarello, Enrico; Carlini, Filippo M.; Neri, Carlo; and Platone, Edoardo, 4,942,179, Cl. 514-659.000.

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Ensar Corporation: *See*—
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Entech Corporation: *See*—
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Eppley, Mark; and Rysavy, Peter B., to Traveling Software, Inc. Data transfer cable. 4,941,845, Cl. 439-505.000.

Era, Susumu; Kobayashi, Setsuo; Nakamura, Mariko; and Mukoh, Akio, to Hitachi, Ltd. Optical data storage medium. 4,942,073, Cl. 428-64.000.

Ergenics, Inc.: *See*—
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Ernst, Donald M.: *See*—
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ESI Companies, Inc.: *See*—
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Estes, Mark W.; Eisen, Ivan R.; and Peters, Anthony M., to International Business Machines Corporation. Method for providing a dynamic tutorial display. 4,941,829, Cl. 434-118.000.

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Etcheparre, Bernard: *See*—
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Ethyl Corporation: *See*—
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Moehle, William E.; Rogers, John J.; and Semen, John, 4,942,145, Cl. 501-90.000.

Eumuco Aktiengesellschaft fur Maschinenbau: *See*—
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Evans, Marvin; and Miller, David H. Apparatus for heat treating contaminated particulate material. 4,941,822, Cl. 432-112.000.

Evans, Steven: *See*—
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Evans, Wayne E., to Shell Oil Company. Method for preparing ferrierite. 4,942,027, Cl. 423-328.000.

Evers, Heinz: *See*—
Eiben, Klaus; and Evers, Heinz, 4,941,998, Cl. 252-627.000.

Ewen, James G., to DLMA Transportation Inc. Rear wheel suspension and steering system. 4,941,543, Cl. 180-254.000.

Exmark Manufacturing Company Incorporated: *See*—
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Expert Corporation: *See*—
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Exxon Chemical Patents Inc.,: *See*—
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Fabianowski, Jan; Ibach, Robert; and Gierse, Georg. Short-circuit protector for a half-controlled three-phase bridge. 4,942,494, Cl. 361-93.000.

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FAG Kugelfischer Georg Schafer (KGaA): *See*—
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Fagg, Barry S.: *See*—
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Fan, Caesar. Over-loading idling lock set. 4,941,697, Cl. 292-336.300.

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Farnell Instruments Limited: *See*—
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Farr, Glyn P. R., to Lucas Industries. Hydraulic anti-lock braking systems for vehicles. 4,941,713, Cl. 303-116.000.

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Farrar, John M.: *See*—
Coates, Jacqueline A.; Farrar, John M.; and Graham, Margaret H., all of, 4,941,983, Cl. 252-8.515.

Farwell, Lawrence A., to University Patents, Inc. Method and apparatus for detection of deception. 4,941,477, Cl. 128-731.000.

Fauck, Gerhard; Pohl, Wolfgang; and Ulrich, Helmut, to Wabco Westinghouse Fahrzeugbremsen GmbH. Relay valve for pneumatic or hydraulic application. 4,941,510, Cl. 137-627.500.

Faulkner, Peter: *See*—
Goosen, Matheus F. A.; King, Glenn A.; Daugulis, Andrew J.; and Faulkner, Peter, 4,942,129, Cl. 435-182.000.

Faulring, Frank W. Actuating mechanism for a ground-engaging tool. 4,941,416, Cl. 111-102.000.

Fawn Engineering Corp.: *See*—
Frerking, David R., 4,942,290, Cl. 235-381.000.

Feist, Horst J. Process for converting carbon blanks into graphite electrodes. 4,942,002, Cl. 264-27.000.

Felix, Augustus; and Uhoch, John, to C. R. Bard, Inc. Control handle for surgical irrigation and suction device. 4,941,872, Cl. 604-27.000.

Felle, Karl; and Krastel, Heinz, to Carl-Zeiss-Stiftung. Shutter for a photogrammetric camera. 4,942,415, Cl. 354-234.100.

Fenie, Michel: *See*—
Labaig, Jean-Jacques; Fenie, Michel; and Glotin, Michel, 4,942,070, Cl. 428-36.900.

Fernandez, Helen M. Skin moisturizing product and process. 4,942,153, Cl. 514-2.000.

Fernwood, Mark; and Blake, Thomas S. Rear reservoir micro sandblaster. 4,941,298, Cl. 51-438.000.

Ferrari, John S.; and Sommers, Dale C. Railroad grade crossing motorist warning system. 4,942,395, Cl. 340-907.000.

Ferrari, Patrick F. Fish protection system. 4,941,432, Cl. 119-3.000.

Ferrario, Renzo: *See*—
Condo, Antonino; and Ferrario, Renzo, 4,942,025, Cl. 423-282.000.

Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., to Space Industries Partnership, L.P. Portable robotic tool rack. 4,941,577, Cl. 211-70.600.

Fest, Christa: *See*—
Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,912, Cl. 71-92.000.

Fiber Materials, Inc.: *See*—
Verry, Edward H., 4,942,537, Cl. 364-512.000.

Fibertek, Inc.: *See*—
Koechner, Walter, 4,942,302, Cl. 250-368.000.

Fichtel & Sachs AG: *See*—
Schraut, Alfred, 4,941,558, Cl. 192-107.00C.

Fiedler, Gerhard: *See*—
Conzelmann, Gerhard; Nagel, Karl; and Fiedler, Gerhard, 4,942,308, Cl. 307-202.100.

Fietzke, Gunter, to Gebr. Hofmann GmbH & Co. KG Maschinenfabrik. Method and apparatus for mass centering of a rotor. 4,941,352, Cl. 73-461.000.

Figgie International Inc.: *See*—
Nist, Thomas R.; and Garnett, Edward V., 4,941,546, Cl. 182-17.000.
Wilfong, William G., 4,941,699, Cl. 294-99.100.

Figone, Frank M.: *See*—
Gomes, Gary D.; Gomes, Craig M.; Figone, Frank M.; and Figone, Moira J., 4,941,634, Cl. 248-229.000.

Figone, Moira J.: *See*—
Gomes, Gary D.; Gomes, Craig M.; Figone, Frank M.; and Figone, Moira J., 4,941,634, Cl. 248-229.000.

Finnegan, Danny E. Rasping device. 4,941,246, Cl. 29-78.000.

Fioravanti, Kenneth J.: *See*—
Stelta, Philip D.; Kern, David W.; and Fioravanti, Kenneth J., 4,941,646, Cl. 266-270.000.

Fischell, Robert E. Electrically actuated inflatable penile erection device. 4,941,461, Cl. 128-79.000.

Fischer, Dan E., to Ultradent Products, Inc. Controlled diffusion medicament applicator. 4,941,873, Cl. 604-54.000.

Fischer, Georg: *See*—
Proepper, Wilhelm; Juenkersfeld, Harald; and Fischer, Georg, 4,941,562, Cl. 198-416.000.

Fischle, Rudiger; and von Broock, Ulrich, to Dr. Ing.h.c.F. Porsche AG. Bearing arrangement for a drive assembly of a motor vehicle. 4,941,544, Cl. 180-292.000.

Fish, Aaron M.; and Somasundaram, Hariharan, to Ilco Unican Inc. Door locking arrangement. 4,941,334, Cl. 70-214.000.

Fish, Gordon E.: *See*—
Raybould, Derek; Fish, Gordon E.; and Denk, Joseph, 4,942,322, Cl. 310-156.000.

Fisher, Joseph, to Joseph Fisher. Non-invasive method and apparatus for measuring mixed venous blood carbon dioxide pressure (PVCO2) and other physiological variables. 4,941,476, Cl. 128-719.000.

Fitch, John J.; and Parker, Tim, to Dennison Manufacturing Company. Toner receptive coating. 4,942,410, Cl. 346-160.100.

Flakt AB: *See*—
Gustavsson, Lennart; Lindau, Leif; and Johansson, Lars-Erik J, 4,941,896, Cl. 55-95.000.

Flament, Daniel. Device for stabilizing objects within the trunk of a vehicle. 4,941,784, Cl. 410-121.000.

Flanagan, Thomas P.; and Puletti, Paul, to National Starch and Chemical Investment Holding Corporation. Toughened rubber based hot melt adhesive compositions for bookbinding applications. 4,942,195, Cl. 524-294.000.

Fleck, Rod; Poret, Mark; Mattheis, Karl-Heinz; Magana, Javier; and Meinhold, Christoph, to Siemens Aktiengesellschaft; and Advanced Micro Devices Inc. Counter/timer circuit for a microcontroller. 4,942,559, Cl. 368-113.000.

Fleckenstein, Theo; Goebel, Gerd; Carduck, Franz-Josef; Bremus, Norbert; and Eicher, Reinhard, to Henkel Kommanditgesellschaft auf Aktien. Process for producing fatty alcohols and $C_3$ diols by catalytic hydrogenation. 4,942,266, Cl. 568-864.000.

Fletcher, Carl R.: *See*—
Sarnoff, Norton; and Fletcher, Carl R., 4,941,401, Cl. 99-446.000.

Flexman, Edmund A.; and Sosnowski, James J., to Du Pont de Nemours, E. I., and Company. Polyamide-polyaryiate composition containing elastomeric modifier and epoxy-functional copolymer. 4,942,200, Cl. 525-66.000.

Flider, Frank S., to Justrite Manufacturing Company. Overpack drum. 4,941,588, Cl. 220-302.000.

Fliss, Thomas A., to Albany International Corporation. Method to reduce forming fabric edge curl. 4,941,239, Cl. 26-28.000.

Flory, Mark T. Electrical light illumination for kites flown at night. 4,942,506, Cl. 362-253.000.

Flotow, Richard A.; and Dickson, Thomas G., to Dana Corporation. Intermediate plate positioner means for a friction clutch assembly. 4,941,557, Cl. 192-70.250.

Fluest, Stewart L.; Hart, Colin; McCree, Charles D.; and Lotsch, Charles F., to CertainTeed Corporation. Panel packaging system. 4,941,309, Cl. 53-544.000.

Fluorochem Inc.: *See*—
Baum, Kurt; Malik, Aslam A.; and Tzeng, Donald D., 4,942,164, Cl. 528-70.000.

FMC Corporation: *See*—
Sardisco, Gioacchino, 4,942,051, Cl. 426-489.000.

FMTT, Inc.: *See*—
Herbert, Edward; Repp, John D.; and Cebry, Stephen E., 4,942,353, Cl. 323-361.000.

Focal Technologies Incorporated: *See*—
Colbourne, Paul D., 4,942,306, Cl. 250-577.000.

Focke & Co. (GmbH & Co.): *See*—
Focke, Heinz, 4,941,374, Cl. 83-13.000.

Focke, Heinz, to Focke & Co. (GmbH & Co.). Process and apparatus for the loading of pallets in layers. 4,941,374, Cl. 83-13.000.

Foerster, Erhard: *See*—
Richter, Wolfgang-Dieter; Weeger, Engelbert; Uebel, Lutz; and Foerster, Erhard, 4,941,409, Cl. 105-157.100.

Foley, Kevin M.; Griffin, Charles C.; and Amaya, Eduardo, to Hepar Industries, Inc. Low molecular weight heparin derivatives having improved anti-Xa specificity. 4,942,156, Cl. 514-56.000.

Fong, Conrad T.; Grabenkort, Richard W.; Huntley, Scott P.; and Wecker, Sheldon M., to Abbott Laboratories. Method of packaging for a sterilizable calibratable medical device. 4,941,308, Cl. 53-425.000.

Fornasier, Roberto; Tornatore, Massimo; and Chapoy, L. Lowrence, to Montedison S.p.A. Thermotropic di-s-triazinic derivatives. 4,942,233, Cl. 544-212.000.

Forschirm, Alex S.; and Davies, Jon H., to Hoechst Celanese Corporation. Polyacetal lighter body resin. 4,942,208, Cl. 525-414.000.

Foss Manufacturing Co., Inc.: *See*—
Murphy, Richard, 4,942,082, Cl. 428-224.000.

Foster, Malcolm C., to Gullick Dobson Limited. Hydraulic power generating pack. 4,941,807, Cl. 417-199.100.

Foster, Ruth E.: *See*—
Anderson, Robert K.; Foster, Ruth E.; and Carlson, Bertyl W., 4,941,313, Cl. 54-24.000.

Fowler, Alan B.; and Timp, Gregory L., to International Business Machines Corporation. Electron tuned quantum well device. 4,942,437, Cl. 357-16.000.

Fraley, Keith D.: *See*—
Waraksa, Thomas J.; Fraley, Keith D.; Kiefer, Richard E.; Douglas, Daniel G.; and Gilbert, Lee H., 4,942,393, Cl. 340-825.720.

Framatome: *See*—
Gaudin, Jean P.; and Peyrot, Jean P., 4,942,280, Cl. 219-60.200.

Francisco, Robert, to Pitney Bowes Inc. Collation record generation and control. 4,942,535, Cl. 364-478.000.

Franck, Reinhard: *See*—
Marxer, Rochus; and Franck, Reinhard, 4,941,488, Cl. 132-323.000.

Franek, Henning: *See*—
Meinert, Norbert; Huber, Werner; Dreuth, Rainer; and Franek, Henning, 4,941,907, Cl. 65-66.000.

Franey, Michael A.: *See*—
Linstroth, Thomas; Franey, Michael A.; and Idzorek, George C., 4,942,616, Cl. 381-51.000.

Frank, Amos; and Kehat, Joel, to Ben-Dak, Joseph D. Automatic book mark. 4,941,684, Cl. 281-42.000.

Franklin, Daniel L.; Goembel, Arthur J.; and Hahn, Douglas D., to Geo. A. Hormel & Company. Vacuum chilling for processing meat. 4,942,053, Cl. 426-524.000.

Frauca, Vicente T., to Irwin Toy Limited. Construction piece for toy vehicle track. 4,941,610, Cl. 238-10.00A.

Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V.: *See*—
Strehlow, Peter; and Schmidt, Helmut, 4,941,993, Cl. 252-315.600.

Frawley, Patrick J., III, to Schick Laboratories, Inc. Composition for the treatment of substance abuse. 4,942,175, Cl. 514-535.000.

Frazier, Thomas A.: *See*—
Lambelet, Lawrence E., Jr.; and Frazier, Thomas A., 4,941,598, Cl. 222-321.000.

Frederick, Curt: *See*—
Hull, Frank A.; Archer, H. Brent; and Frederick, Curt, 4,941,746, Cl. 356-444.000.

Freimann, Paul; and Staudinger, Gernot, to Voest-Alpine Aktiengesellschaft. Process for gasifying fuels. 4,941,890, Cl. 48-197.00R.

Frenken, Hans: *See*—
Schweicher, Wolfgang; Frenken, Hans; Bussmann, Heinrich; Browatzki, Kurt; and Sobel, Johannes, 4,942,068, Cl. 427-420.000.

Frerking, David R., to Fawn Engineering Corp. Dispensing machine having horizontal product carrier movable through an elliptical-type path. 4,942,290, Cl. 235-381.000.

FreshNes Foods Corporation: *See*—
Miles, Milton C., 4,941,327, Cl. 62-246.000.

Freund, Wolfgang; Hamprecht, Gerhard; Wuerzer, Bruno; Westphalen, Karl-Otto; and Meyer, Norbert, to BASF Aktiengesellschaft. 2-phenylpyridazin-3-one compounds, their preparation and their use as herbicides. 4,941,911, Cl. 71-92.000.

Freyssinet International (STUP): *See*—
Jartoux, Pierre, 4,941,303, Cl. 52-223.00L.

Fricke, Hans-Michael: *See*—
Schonert, Klaus; and Fricke, Hans-Michael, 4,941,969, Cl. 209-39.000.

Friedman, Herbert, to Ivy Hill Corporation. Sift-proof carton and blank therefor. 4,941,575, Cl. 206-621.300.

Frigoscandia Contracting AB: *See*—
Olsson, Lennart, 4,941,567, Cl. 198-778.000.

Fritz Eichenauer GmbH & Co. KG: *See*—
Roller, Hanno; and Starck, Roland, 4,942,289, Cl. 219-504.000.

Frye, Bruce J. Adhesive holding device with separable elements. 4,942,071, Cl. 428-40.000.

Fuerstman, Leland L., to Color Ident Systems Corporation. Package identification system. 4,941,573, Cl. 206-459.000.

Fuji Jukogyo Kabushiki Kaisha: *See*—
Muto, Naoto, 4,941,438, Cl. 123-90.460.
Watanabe, Hideo, 4,941,441, Cl. 123-325.000.

Fuji Photo Film Co., Ltd.: *See*—
Hatori, Masami, 4,941,722, Cl. 350-96.130.
Koizumi, Shigeo; and Kita, Nobuyuki, 4,942,109, Cl. 430-175.000.
Mori, Nobufumi; Hosoi, Yuichi; and Takahashi, Kenji, 4,942,300, Cl. 250-327.200.
Saeki, Keiso; Endo, Tosiaki; Satomura, Masato; and Shinozaki, Fumiaki, 4,942,107, Cl. 430-138.000.
Shiba, Keisuke; and Koya, Keizo, 4,942,114, Cl. 430-434.000.
Shiota, Kazuo, 4,942,462, Cl. 358-76.000.
Terashita, Takaaki; and Okada, Sethuo, 4,942,424, Cl. 355-38.000.
Usami, Toshimasa; Tanaka, Toshiharu; and Kiritani, Masataka, 4,942,150, Cl. 503-213.000.

Fujii, Norio: *See*—
Takagi, Makoto; Fujii, Norio; and Fujimori, Yoshihiko, 4,942,619, Cl. 382-47.000.

Fujimaki, Hiroaki, to Tomy Kogyo Co., Inc. Animal toys having switch and vibration motor. 4,941,857, Cl. 446-353.000.

Fujimori, Yoshihiko: *See*—
Takagi, Makoto; Fujii, Norio; and Fujimori, Yoshihiko, 4,942,619, Cl. 382-47.000.

Fujinami, Yasushi: *See*—
Kutaragi, Ken; Tanaka, Shoji; and Fujinami, Yasushi, 4,942,486, Cl. 360-48.000.

Fujisawa, Yoshikazu; Hata, Tsunehisa; and Hayashi, Tadayoshi, to Honda Giken Kogyo Kabushiki Kaisha. Fiber-reinforced piston ring for internal combustion engine. 4,941,669, Cl. 277-235.00R.

Fujita, Nagahisa, to Mazda Motor Company. Engine control apparatus. 4,941,444, Cl. 123-399.000.

Fujita, Nobuhiko: *See*—
Itozaki, Hideo; Tanaka, Saburo; Fujita, Nobuhiko; Yazu, Shuji; and Jodai, Tetsuji, 4,942,142, Cl. 505-1.000.

Fujitsu America, Inc.: *See*—
Nigam, Anil K., 4,942,484, Cl. 360-46.000.

Fujitsu Limited: *See*—
Hirose, Fumiyasu, 4,942,615, Cl. 364-578.000.
Horikoshi, Eiji; Iikawa, Tsutomu; and Sato, Takehiko, 4,941,918, Cl. 75-229.000.

Fujitsu Ten Limited: *See*—
Takayama, Kazuo; and Fuse, Hidefumi, 4,942,622, Cl. 455-278.000.

Fujiura, Yoshitsugu, to AMP Incorporated. Shielded electrical connector having an insulating cover on the shielding member. 4,941,849, Cl. 439-610.000.

Fujiwara, Mikio; and Komohara, Minoru, to Ikeda Bussan Company Ltd. Locking slide apparatus for mounting a seat. 4,941,636, Cl. 248-/30.000.

Fukai, Masayuki: *See*—
Miyagaki, Hisanori; Shimizu, Katsuhito; Tobita, Haruya; Takita, Atsushi; Kimura, Tooru; Sugano, Akira; Kikuchi, Masayuki; and Fukai, Masayuki, 4,942,514, Cl. 364-190.000.

Fukai, Tetsuro: *See*—
Hara, Yoshimasa; Ohkura, Seisaku; Iijima, Fumio; Tamura, Isamu; Fukai, Tetsuro; Tagiri, Samiho; and Takagi, Norimasa, 4,941,794, Cl. 414-341.000.

Fukatsu, Yoshiaki; Nomura, Etsuji; and Matsui, Kazuma, to Nippondenso Co., Ltd. Gas rate gyro. 4,941,353, Cl. 73-505.000.

Fukaya, Katsuyoshi, to Aisan Kogyo Kabushiki Kaisha. Electric motor. 4,942,325, Cl. 310-257.000.

Fukuda, Shunpei: *See*—
Ohe, Kazuhide; Sato, Kazuo; Fukuda, Shunpei; and Nakada, Hiroyuki, 4,941,818, Cl. 431-268.000.

Fukudome, Katsuyuki: *See*—
Mori, Ryuichiro; Fukudome, Katsuyuki; Akiyama, Tatsuhiko; and Takemoto, Yoshitaka, 4,942,454, Cl. 357-70.000.

Fukui, Kunisuke: *See*—
Motooka, Masanori; Takimoto, Kazuyuki; and Fukui, Kunisuke, 4,942,087, Cl. 428-332.000.

Fukui, Minoru: *See*—
Nishijima, Jun-ichi; and Fukui, Minoru, 4,942,364, Cl. 324-696.000.

Fukumoto, Hirohiko: *See*—
Sakamoto, Yujiro; Kurosaka, Toshio; Fukumoto, Hirohiko; Miyake, Toshiya; and Tokunaga, Hirohiko, 4,941,628, Cl. 244-12.200.

Fukumoto, Katsumi: *See*—
Sampei, Keiichi; Kawasaki, Masami; Dei, Yosihito; Fukumoto, Katsumi; and Furukawa, Kazuo, 4,941,863, Cl. 474-33.000.

Fukumoto, Takaaki: *See*—
Kaminura, Yasuo; Ohmori, Toshiaki; Yanagi, Motomori; Fukumoto, Takaaki; and Hama, Masaharu, 4,941,489, Cl. 134-95.000.

Fukuoka, Tatsuhiko: *See*—
Asada, Eiji; Tomikawa, Takashi; and Fukuoka, Tatsuhiko, 4,941,919, Cl. 75-235.000.

Fukushima, Hisao: *See*—
Araki, Kazui; Kobayashi, Yoshio; Matsumoto, Seiji; and Fukushima, Hisao, 4,941,814, Cl. 425-388.000.

Funabashi, Yuichi: *See*—
Zama, Yoshiaki; Umeda, Itsuki; Takemura, Yasuhiko; Takashima, Masaaki; Funabashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Yoshida, Hiromichi, 4,942,202, Cl. 525-104.000.

Funahashi, Yoshiki; and Hibi, Masayuki, to Tokai Rubber Industries, Ltd. Fluid-filled cylindrical elastic mount having means for improved durability of elastic body. 4,941,649, Cl. 267-140.100.

Furihata, Makoto: *See*—
Watanabe, Toshinori; Mori, Fumihiko; Nishiyama, Tamotsu; Furihata, Makoto; Kominami, Yasuo; and Horie, Noboru, 4,942,536, Cl. 364-490.000.

Furuhashi, Hiroyuki; Nakano, Akira; Murata, Masahide; Imai, Masafumi; and Ueno, Hiroshi, to Toa Nenryo Kogyo, K.K. Catalyst component for olefin polymerization. 4,942,148, Cl. 502-115.000.

Furuhashi, Kenshi; Ito, Hiroyasu; and Enari, Nobuyuki, to Kabushiki Kaisha Tokai-Rika-Denki Seisakusho. Multiple circuit switch with rockable activator and linearly movable contact holder. 4,942,273, Cl. 200-61.540.

Furuhashi, Tatsuo: *See*—
Nasu, Yasunobu; Ogishima, Taichi; Dei, Akira; Uchida, Haruhiko; Inami, Mitsuru; Furuhashi, Tatsuo; Hino, Yasuhiko; and Sugimura, Hideo, 4,942,048, Cl. 426-271.000.

Furukawa, Kazuo: *See*—
Sampei, Keiichi; Kawasaki, Masami; Dei, Yosihito; Fukumoto, Katsumi; and Furukawa, Kazuo, 4,941,863, Cl. 474-33.000.

Fuse, Hidefumi: *See*—
Takayama, Kazuo; and Fuse, Hidefumi, 4,942,622, Cl. 455-278.000.

Fuse, Masaki: *See*—
Ichimura, Kiyoshi; Ito, Kideaki; Fuse, Masaki; Suematsu, Chiaki; Suzuki, Shingo; and Takahashi, Satoshi, 4,942,292, Cl. 250-203.400.

Futaba Denshi Kogyo Kabushiki Kaisha: *See*—
Kato, Hideo, 4,942,276, Cl. 200-517.000.

G-C Dental Industrial Corp.: *See*—
Kimura, Hiroshi, 4,941,828, Cl. 433-114.000.

Gabrick, Albert. Controlling and recovering oil spills from the environment. 4,941,978, Cl. 210-693.000.

Galante, Richard L.; Waibel, Terry J.; and Windham, Terrell D., to Goodyear Tire & Rubber Company, The. Pneumatic tire. 4,941,523, Cl. 152-543.000.

Galatron S.r.l.: *See*—
Orlandi, Alessio, 4,941,509, Cl. 137-625.170.

Gall, Rudi; and Bosies, Elmar, to Boehringer Mannheim GmbH. 1-hydroxy-3-(N-methyl-N-propylamino)propane-1,1-diphosphonic acid, pharmaceutical compositions and methods of use. 4,942,157, Cl. 514-108.000.

Galloway, Edwin J., to Galloway Trust. Aseptic fluid transfer apparatus and methods. 4,941,517, Cl. 141-1.000.

Galloway Trust: *See*—
Galloway, Edwin J., 4,941,517, Cl. 141-1.000.

Gamarra, Jose P., to Raychem Corporation. Cable sealing apparatus comprising heat resistant gel compositions. 4,942,270, Cl. 174-93.000.

Gardziella, Arno; and Kwasniok, Alois, to Rutgerswerke AG. Novel heat-hardenable binders phenol-formaldehyde+HMT+acid. 4,942,217, Cl. 528-129.000.

Garland, Robert B.; and Miyano, Masateru, to National Research Development Corporation. Novel intermediates in the manufacture of novel thromboxane $A_2$ antagonists. 4,942,256, Cl. 560-121.000.

Garner, Darryl M., to Garner, Sandra Brown. Portable business card slit cutter. 4,941,381, Cl. 83-468.940.

Garner, Sandra Brown: *See*—
Garner, Darryl M., 4,941,381, Cl. 83-468.940.

Garner, Scott W.: *See*—
Mort, Thomas W.; Stern, Philip A.; and Garner, Scott W., 4,942,432, Cl. 355-260.000.

Garnett, Edward V.: *See*—
Nist, Thomas R.; and Garnett, Edward V., 4,941,546, Cl. 182-17.000.

Garwood, William E.; Krambeck, Frederick J.; Kushnerick, John D.; and Tabak, Samuel A., to Mobil Oil Corporation. Multistage system for conversion of lower olefins with reactor quenching means. 4,942,021, Cl. 422-194.000.

Gas Research Institute: *See*—
Thrasher, William H; Pavlik, Charles M.; and Moon, Larry, 4,941,452, Cl. 126-110.00R.

Gasbarro, Geno N. Apparatus for producing sized controlled portions of meat. 4,941,379, Cl. 83-409.200.

Gasiunas, Donatas V., to Pitney Bowes Inc. Hall effect encoder apparatus. 4,942,394, Cl. 340-870.310.

Gast, William F.; and Rhodes, Charles F., Jr., to Oryx Energy Company. Method and apparatus for determining earth resistivities in the presence of extraneous earth currents. 4,942,361, Cl. 324-360.000.

Gaudin, Jean P.; and Peyrot, Jean P., to Framatome. Device for welding the end of a tubular piece fastened inside a bore opening onto a face of a plate, such as a tube plate of a steam generator. 4,942,280, Cl. 219-60.200.

Gaughan, Kevin J.: *See*—
Devitt, Francis E.; Doran, John P.; and Gaughan, Kevin J., 4,942,344, Cl. 318-254.000.

Gavezotti, Piero: *See*—
Strepparola, Ezio; Alfieri, Mario; and Gavezotti, Piero, 4,941,987, Cl. 252-58.000.

GDT Pty. Ltd.: *See*—
Bailey, Raymond J., 4,941,560, Cl. 194-250.000.

Gearard, Marie: *See*—
Bouchez, Alain; Cognard, Patrice; Gearard, Marie; and Schmidt, Alain, 4,941,750, Cl. 366-147.000.

Gebr. Hofmann GmbH & Co. KG Maschinenfabrik: *See*—
Fietzke, Gunter, 4,941,352, Cl. 73-461.000.

Gebr. Isringhausen: *See*—
Granzow, Manfred; and Mischer, Hans-Peter, 4,941,641, Cl. 248-588.000.

Geen, Graham R.: *See*—
Haraden, Michael R.; Jarvest, Richard L.; and Geen, Graham R., 4,942,166, Cl. 514-262.000.

Geho, W. Blair; and Lau, John R. Therapy by vesicle delivery to the hydroxyapatite of bone. 4,942,036, Cl. 424-425.000.

Gellert, Jobst U. Method of making an injection molding nozzle having nose portion with heating element encircling the bore. 4,941,249, Cl. 29-611.000.

Gembarowski, Mark L., to Hewlett-Packard Company. Method for recovery from synchronization loss in a queued data transfer. 4,942,523, Cl. 364-200.000.

Gemmer, Hans-Jurgen. Method for applying a conductor layer on a road surface and arrangement of a heating layer on a road surface. 4,941,770, Cl. 404-72.000.

Gemplus Card International: *See*—
Peres, Philippe; and Deveaud, Vincent, 4,942,495, Cl. 361-220.000.

Genba, Tsuneo; Yoshinaka, Junichi; and Nakanishi, Shingo, to Kuraray Company Limited. Rapidly shrinking fiber and water-absorbing shrinkable yarn and other materials comprising same. 4,942,089, Cl. 428-364.000.

General Electric Company: *See*—
Baliga, Bantval J.; and Wildi, Eric J., 4,942,440, Cl. 357-23.100.
Baliga, Bantval J.; and Chang, Hsueh-Rong, 4,942,445, Cl. 357-38.000.
Bergman, Rolf S.; and Harris, William O., 4,942,331, Cl. 313-271.000.
Bulman, Melvin J., 4,941,390, Cl. 89-7.000.
Eberhard, Jeffrey W.; Koegl, Rudolph; and Keaveney, John P., 4,942,596, Cl. 378-109.000.
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Lee, Walter J.; and Hissem, Catherine S., 4,942,012, Cl. 264-510.000.
Marlowe, Mickey O.; Rosenbaum, Herman S.; Rowland, Trevor C.; Patterson, Charles B., Jr.; and Davies, John H., 4,942,016, Cl. 376-418.000.
Milkovic, Miran, 4,942,367, Cl. 330-9.000.
Tarzainki, Richard J.; and Hwang, Richard C., 4,942,400, Cl. 341-155.000.
Thomas, Charles E., 4,942,387, Cl. 340-683.000.
Toda, Minoru, 4,942,366, Cl. 330-4.300.
Waldman, Harvey; and Lu, Chung H., 4,942,467, Cl. 358-135.000.
Wei, Ching-Yeu; Piacente, Patricia A.; and Woodbury, Henry H., 4,942,449, Cl. 357-54.000.
White, Dwain M.; Socha, Laura A.; and Van Der Meer, Roelof, 4,942,206, Cl. 525-397.000.
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Witte, James R., 4,942,294, Cl. 250-227.140.

General Instrument Corporation: *See*—
Korwin-Pawlowski, Michael, 4,942,139, Cl. 437-209.000.

General Motors Corporation: *See*—
Snyder, George K., 4,941,378, Cl. 83-350.000.

Genovese, Frank C.; and Orlowski, Thomas E., to Xerox Corporation. High resolution conductor patterning. 4,942,110, Cl. 430-198.000.

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Rudolf, Boris; and Gentischer, Josef, 4,941,292, Cl. 51-168.000.

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Franklin, Daniel L.; Goembel, Arthur J.; and Hahn, Douglas D., 4,942,053, Cl. 426-524.000.

George, Rosemary J. Unitary garment. 4,941,209, Cl. 2-79.000.

Gerhard, Helmut, to Westerwaelder Eisenwerk Gerhard GmbH. Pressure tank. 4,941,583, Cl. 220-5.00A.

Gesing, Ernst: *See*—
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Gessaman, Bill; Lantz, Paul; and Parle, Jon, to John Fluke Mfg. Co., Inc. Analog to digital conversion with charge balanced voltage to frequency converter having polarity responsive offset. 4,942,401, Cl. 341-157.000.

GFS, Inc.: *See*—
Gomes, Gary D.; Gomes, Craig M.; Figone, Frank M.; and Figone, Moira J., 4,941,634, Cl. 248-229.000.

Gibson, Michael S., to Procter & Gamble Company, The. Production of polyol polyesters having reduced color content. 4,942,228, Cl. 536-119.000.

Giebeler, Robert: *See*—
Chulay, Steven J., deceased; Minton, Allen P.; and Giebeler, Robert, 4,941,868, Cl. 494-37.000.

Gierse, Georg: *See*—
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Waraksa, Thomas J.; Fraley, Keith D.; Kiefer, Richard E.; Douglas, Daniel G.; and Gilbert, Lee H., 4,942,393, Cl. 340-825.720.

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Doemens, Guenter; and Gilch, Markus, 4,941,363, Cl. 73-862.330.

Gilham, Richard J. Solid fuel burning heater. 4,941,451, Cl. 126-77.000.

Giovanni, Garofalo, to AMF Mares S.p.A. Regulator for breathing apparatus. 4,941,468, Cl. 128-204.260.

Gittins, James D.: *See*—
Beeley, Michael G.; Gittins, James D.; and Sinykin, William B., 4,941,275, Cl. 37-219.000.

GKN Automotive Inc.: *See*—
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Glass Instruments Inc.: *See*—
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Glattli, Hans H.: *See*—
Stoll, Kurt; and Glattli, Hans H., 4,941,642, Cl. 249-122.000.

Glenn, Robert A. Knife with wrist brace. 4,941,261, Cl. 30-296.100.

Glinski, Jan: *See*—
Haugwitz, Rudiger D.; Zalkow, Leon; Glinski, Jan; Suffness, Mathew; Deutsch, Howard M.; and Narayanan, Venkatachala, 4,942,184, Cl. 514-449.000.

Glotin, Michel: *See*—
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Gloton, Jean-Pierre, to SGS-Thomson Microelectronics SA. Method for fixing an electronic component and its contacts to a support. 4,941,257, Cl. 29-840.000.

GMF Robotics Corporation: *See*—
McGee, H. Dean; Krause, Kenneth W.; and Coldren, Bruce E., 4,942,539, Cl. 364-513.000.

Gmoser, Johann: *See*—
Paar, Willibald; Schipfer, Rudolf; and Gmoser, Johann, 4,942,196, Cl. 524-327.000.

Godard, Bruno, to Societe anonyme dite: Compagnie Generale d'Electricite. Device for illuminating an auxiliary track of a motion picture film. 4,942,566, Cl. 369-113.000.

Godber, John: *See*—
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Godin, Lawrence J., to Chrysler Corporation. Rear wheel steering drive mechanism. 4,941,672, Cl. 280-91.000.

Goebel, Gerd: *See*—
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Goembel, Arthur J.: *See*—
Franklin, Daniel L.; Goembel, Arthur J.; and Hahn, Douglas D., 4,942,053, Cl. 426-524.000.

Goerss, William G.; and Farrah, William J., to Automated Cleaning Systems, Inc. Method and apparatus for cleaning containers. 4,941,491, Cl. 134-111.000.

Gofuku, Yoshihiro: *See*—
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Gold, Gerald: *See*—
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Wilkie, Brian F.; Goler, Vernon B.; Groves, Stanley E.; and Vaglica, John J., 4,942,522, Cl. 364-200.000.

Golf Comback AB: *See*—
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Gomes, Craig M.: *See*—
Gomes, Gary D.; Gomes, Craig M.; Figone, Frank M.; and Figone, Moira J., 4,941,634, Cl. 248-229.000.

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Goodell, Paul D.; and Mitchell, Lawrence C., Sr., to Ergenics, Inc. Gas purifier. 4,942,019, Cl. 422-169.000.

Goodlander, Theodore J.; Valdepenas, Jose M.; McCaskey, Ricardo E. V.; and Vizcaino, Gerardo, to Cab-Tek, Inc. High-speed, high-capacity, fault-tolerant error-correcting storage system. 4,942,579, Cl. 371-51.000.

Goodyear Tire & Rubber Company, The: *See*—
Galante, Richard L.; Waibel, Terry J.; and Windham, Terrell D., 4,941,523, Cl. 152-543.000.

Goosen, Matheus F. A.; King, Glenn A.; Daugulis, Andrew J.; and Faulkner, Peter, to Queen's University at Kingston. Multiple membrane microencapsulation. 4,942,129, Cl. 435-182.000.

Gordecon, Inc.: *See*—
Gordon, George W.; and Economy, Theodore F., 4,941,799, Cl. 414-678.000.

Gordon, Alastair T.; and Reichmann, Michael H., to Alphanet Technology Corporation. Location identification. 4,942,599, Cl. 379-93.000.

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Gosiewski, Donald E.: *See*—
Briggs, Paul C.; and Gosiewski, Donald E., 4,942,201, Cl. 525-71.000.

Gosselin, Claude. Method of sealing by injecting a mixture based on acrylamide and the corresponding mixture. 4,942,199, Cl. 524-724.000.

Goto, Kazuo: *See*—
Noguchi, Toru; Takada, Toshimichi; Yonezaki, Takahiro; Yamaguchi, Yoshio; Kakiuchi, Hajime; Deki, Shigehito; Goto, Kazuo; Miyata, Hitoshi; and Mashimo, Satoshi, 4,941,961, Cl. 204-294.000.

Goto, Tetsuro: *See*—
Saeguss, Takashi; Goto, Tetsuro; and Yasukawa, Seiichi, 4,942,413, Cl. 354-173.110.

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Goulet, Raymond L.: *See*—
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Grabbe, Dimitry G.: *See*—
Korsunsky, Iosif; Kopp, Monte L.; and Grabbe, Dimitry G., 4,941,832, Cl. 439-71.000.

Grabenkort, Richard W.: *See*—
Fong, Conrad T.; Grabenkort, Richard W.; Huntley, Scott P.; and Wecker, Sheldon M., 4,941,308, Cl. 53-425.000.

Graetz, Nokia: *See*—
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Graham, Margaret H., all of: *See*—
Coates, Jacqueline A.; Farrar, John M.; and Graham, Margaret H., all of, 4,941,983, Cl. 252-8.515.

Granzow, Manfred; and Mischer, Hans-Peter, to Gebr. Isringhausen. Vehicle seat. 4,941,641, Cl. 248-588.000.

Graton, Michel, to VALEO. Coaxial torsion damper, particularly for automotive vehicles. 4,941,860, Cl. 464-68.000.

Gray, George W.: *See*—
Jackson, Adam; Scrowston, Richard M.; Gray, George W.; Lacey, David; and Toyne, Kenneth J., 4,941,992, Cl. 252-299.660.

Great Lakes Chemical Corporation: *See*—
Dadgar, Ahmad; and Shin, Charles C., 4,941,982, Cl. 252-8.551.

Greco, Alberto; and Raisa, Luigi, to Enichem Synthesis S.p.A. Thermosetting liquid composition containing a polyepoxide and a tricarboxylic isocyanurate. 4,942,215, Cl. 528-114.000.
Green, Gilbert, Jr.: *See*—
Libby, Stuart E.; Lindskog, William J.; and Green, Gilbert, Jr., 4,942,500, Cl. 361-516.000.
Green, James R., to Du Pont de Nemours, E. I., and Company. Comfortable fabrics of high durability. 4,941,884, Cl. 8-120.000.
Greene, Richard A.: *See*—
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,941,795, Cl. 414-403.000.
Greer, Bradley G., to A & E Systems, Inc. Awning hinge. 4,941,524, Cl. 160-67.000.
Gregor, Rainer: *See*—
Englert, Heinrich C.; Hropot, Max; Lang, Hans-Jochen; and Gregor, Rainer, 4,942,176, Cl. 514-539.000.
Gregory, Bertram H., to Exxon Chemical Patents Inc. Process for high speed coating of substrates. 4,941,935, Cl. 156-243.000.
Gregory, Walter A.; and Kezar, Hollis S., III, to Du Pont de Nemours, E. I., and Company. Aminomethyl oxooxazolidinyl aroylbenzene derivatives useful as antibacterial agents. 4,942,183, Cl. 514-376.000.
Grein, Arpad: *See*—
Cassinelli, Giuseppe; Grein, Arpad; Merli, Sergio; and Rivola, Giovanni, 4,942,155, Cl. 514-34.000.
Greiner, Ferdinand: *See*—
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Gresch, Heinrich: *See*—
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Gribbin, John D.; Dallmann, Hermann; Engel, Dieter; and Hensel, Hartmut, to Hoechst Aktiengesellschaft. Reclaimable polyester film having adhesion-promoting coating. 4,942,088, Cl. 428-336.000.
Griffin, Charles C.: *See*—
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Grilliot, Mary I.: *See*—
Grilliot, William L.; and Grilliot, Mary I., 4,941,213, Cl. 2-312.000.
Grilliot, William L.; and Grilliot, Mary I. Firefighter's boot and trouser attachment. 4,941,213, Cl. 2-312.000.
Grimm, Gerhard: *See*—
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Gross, Stanley. Low temperature apparatus for cleaning jewelry and gems. 4,941,490, Cl. 134-98.000.
Gross, Theodore S., to Converse Inc. Shoe with an artificial tendon system. 4,941,273, Cl. 36-114.000.
Grossa, Mario, to Du Pont de Nemours, E. I., and Company. Solid imaging method utilizing photohardenable compositions of self limiting thickness by phase separation. 4,942,060, Cl. 427-54.100.
Grossa, Mario: *See*—
Fan, Roxy N.; and Grossa, Mario, 4,942,066, Cl. 427-54.100.
Grote & Hartmann GmbH & Co. KG: *See*—
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Groves, Stanley E.: *See*—
Wilkie, Brian F.; Goler, Vernon B.; Groves, Stanley E.; and Vaglica, John J., 4,942,522, Cl. 364-200.000.
Grubb, Lloyd T., Jr.; and Kennamer, Joseph T. Mold guidance system for block making machinery. 4,941,813, Cl. 425-195.000.
Grudic, Gregory Z.; Kelly, Michael F.; and Lawrence, Peter D., to University of British Columbia. Mirror scanner. 4,941,739, Cl. 350-486.000.
Gruen Optik Wetzlar GmbH: *See*—
Hadeishi, Tetsuo; and Le Vay, Thurston, 4,941,743, Cl. 356-311.000.
Grumman Aerospace Corporation: *See*—
Leib, Kenneth G., 4,941,733, Cl. 350-162.130.
Reitman, William, 4,942,388, Cl. 340-701.000.
Gruver, Michael R.: *See*—
Buchholtz, Timothy C.; Gruver, Michael R.; Richetta, Raymond A.; and Schmerbeck, Timothy J., 4,942,399, Cl. 341-143.000.
GTE Products Corporation: *See*—
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GTE Valenite Corporation: *See*—
Cook, Kenneth J., 4,941,782, Cl. 408-147.000.
Guckert, Joseph R.; and Lim, Hyun S., to Du Pont de Nemours, E. I., and Company. Composite fibrous polyethylene sheet. 4,941,947, Cl. 162-103.000.
Guelck, Volker. Window having pivotal step. 4,941,287, Cl. 49-455.000.
Guerro, Gerald J.; and Borsinger, Gregory G., to American Cyanamid Company. Method of manufacturing a sag-resistant bonded particulate article. 4,942,085, Cl. 428-288.000.
Guhl, Walter; and Bansemir, Klaus, to Henkel Kommanditgesellschaft auf Aktien. Pharmaceutical compositions effective for treating skin to destroy eggs of enterobius vermicularis. 4,942,041, Cl. 424-613.000.
Guimond, Ronald; Martiniello, Anthony; Hardy, David W.; and Tellier, Raymond, to Adams-Russell Electronic Company, Inc. Quick connect/disconnect microwave connector. 4,941,846, Cl. 439-578.000.
Gulbransen, Incorporated: *See*—
Williams, Anthony G.; and Starkey, David T., 4,941,387, Cl. 84-609.000.
Gullick Dobson Limited: *See*—
Foster, Malcolm C., 4,941,807, Cl. 417-199.100.
Gumbinner, Robert, to H. T. Products, Inc. Method of preventing bending of lithographic printing plates. 4,942,421, Cl. 355-27.000.
Gunesin, Binnur Z., to Mobil Oil Corporation. Anionic polymerization in high viscosity dispersing medium to form microparticles with narrow size distribution. 4,942,209, Cl. 526-173.000.
Gupta, Balaram; Saw, Cheng K.; Kenny, Malcolm E.; and Harrington, Bruce A., to Hoechst Celanese Corporation. Novel synthesis of sodipotassic copper tube silicates. 4,942,026, Cl. 423-326.000.
Gustavsson, Lennart; Lindau, Leif; and Johansson, Lars-Erik J, to Flakt AB. Method and apparatus for cleansing gases. 4,941,896, Cl. 55-95.000.
Gutsche, Horst: *See*—
Dreschmann, Peter; and Gutsche, Horst, 4,941,759, Cl. 384-531.000.
H. Schreiber Company: *See*—
Schreiber, Adolf, 4,941,715, Cl. 312-184.000.
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Gumbinner, Robert, 4,942,421, Cl. 355-27.000.
Hadeishi, Tetsuo; and Le Vay, Thurston, to Gruen Optik Wetzlar GmbH; and Glass Instruments Inc. High stability high intensity atomic emission light source. 4,941,743, Cl. 356-311.000.
Haesebroek, Guy G.: *See*—
De Schepper, Achille J.; Haesebroek, Guy G.; and Van Peteghem, Antoine L., 4,942,023, Cl. 423-22.000.
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Hagadorn, Irvine R., deceased: *See*—
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Hahn, Douglas D.: *See*—
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Hahn, Steven C.: *See*—
Hazebrook, Daniel W.; and Hahn, Steven C., 4,941,862, Cl. 464-141.000.
Hainsworth, Thomas E.; Spanhak, F. Nicholaas; and Paske, Richard R., Jr., to Bell & Howell Company. Self-adapting signal detector with digital outputs. 4,942,531, Cl. 364-424.200.
Haisch, Bernhard M.; and Bruner, Marilyn E. Tool for extracting anchor bolt from wall. 4,941,252, Cl. 29-261.000.
Hakuto Chemical Co., Ltd.: *See*—
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Halavee, Uriel; Niv, Israel; and Schwarzkopf, Tzila, to Opal, Inc. System for measuring a topographical feature on a specimen. 4,941,980, Cl. 250-310.000.
Hall, Dan M. Piano lifting and transportation apparatus. 4,941,645, Cl. 254-324.000.
Hall, David F., to Eastman Kodak Company. Grease reservoir. 4,941,757, Cl. 384-473.000.
Halliburton Company: *See*—
Brothers, Lance E.; Lindsey, Donald W.; and Terry, Dralen T., 4,941,536, Cl. 166-293.000.
Murphey, Joseph R.; and Totty, Kenneth D., 4,942,186, Cl. 523-131.000.
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Hama, Masaharu: *See*—
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Hamamatsu Photonics Kabushiki Kaisha: *See*—
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Hamamura, Atsushi; Hamada, Takaki; Nakamura, Hiroko; Imai, Tomoyuki; Matsui, Toshiki; and Horiishi, Nanao, to Sumitomo Special Metals, Co., Ltd.; and Toda Kogyo Corp. Corrosion resistant permanent magnet. 4,942,098, Cl. 428-555.000.
Hamersma, Wilhelmus Jozefus L. A.; de Boer, Jan; Roovers, Wilhelmus M. M.; and de Wit, Gerrit, to General Electric Company. Polymer mixture comprising polybutylene terephthalate, aromatic polycarbonate and polydialkysiloxane. 4,942,188, Cl. 523-212.000.
Hamilton, Norman, to Australian Atomic Energy Commission. Calibration of ultrasonic transducers. 4,942,614, Cl. 364-571.010.
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Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, to Dainichiseika Color

& Chemicals Mfg. Co., Ltd.; and Ukima Colour & Chemicals Mfg. Co., Ltd. Polyurethane resin and heat-sensitive recording medium. 4,942,212, Cl. 528-28.000.

Hanaoka, Osamu: *See*—
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Hanauer, George E., to Agri-Automation Company, Ltd. Milking method and related apparatus. 4,941,433, Cl. 119-14.020.

Hanawa, Makoto; Hasegawa, Atsushi; and Nishimukai, Tadahiko, to Hitachi, Ltd.; and Hitachi Microcomputer Engineering Ltd. Microprocessor with a cache memory in which validity flage for first and second data areas are simultaneously readable. 4,942,521, Cl. 364-200.000.

Hanft, Herbert. Door alarm. 4,941,424, Cl. 116-85.000.

Hanil Pharmaceutical Ind., Co., Ltd.: *See*—
Koh, Moon G.; Shin, Jai M.; Kim, Dong S.; and Lee, Choon S., 4,942,243, Cl. 548-193.000.

Hankison Division of Hansen, Inc.: *See*—
Black, James B., 4,941,894, Cl. 55-20.000.

Hans Affupper Textilmaschinenbau GmbH: *See*—
Affupper, Hans, 4,941,241, Cl. 28-196.000.

Hansberry, Mitchell L., to Charles Stark Draper Laboratory, Inc., The. Full felled seam fold assembly. 4,941,417, Cl. 112-142.000.

Hara, Tomoyoshi: *See*—
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Hara, Yoshimasa; Ohkura, Seisaku; Iijima, Fumio; Tamura, Isamu; Fukai, Tetsuro; Tagiri, Sumiho; and Takagi, Norimasa, to Honda Giken Kogyo Kabushiki Kaisha; and Nittsu Shoji Kabushiki Kaisha. Automated loading/unloading equipment. 4,941,794, Cl. 414-341.000.

Harada, Keizo: *See*—
Itozaki, Hideo; Harada, Keizo; and Yazu, Shuji, 4,942,152, Cl. 505-1.000.

Harada Kogyo Kabushiki Kaisha: *See*—
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Harada, Shigeru: *See*—
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Harada, Takuji, to Harada Kogyo Kabushiki Kaisha. Reset circuit for an automobile antenna control device. 4,942,311, Cl. 307-272.300.

Harbor Branch Oceanographic Institution, Inc.: *See*—
Higa, Tatsuo; and Snader, Kenneth M., 4,942,180, Cl. 514-691.000.

Hardin, Tommy G.; and Khorramian, Behrooz A., to AT&T Bell Laboratories. Building cables which include non-halogenated plastic materials. 4,941,729, Cl. 350-96.230.

Harding, Norman T. Wood preservative and method for preserving wood. 4,942,067, Cl. 427-393.000.

Hardy, David W.: *See*—
Guimond, Ronald; Martiniello, Anthony; Hardy, David W.; and Tellier, Raymond, 4,941,846, Cl. 439-578.000.

Hardy, Martin P.; and Buckley, Paul, to Lucas Industries public limited company. Fuel injection nozzle. 4,941,613, Cl. 239-124.000.

Hare, Wilbert K.; Kaufman, Morris; and Moroziuk, William M., to Ekco/Glaco Inc. Baking pan. 4,941,585, Cl. 220-23.200.

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Bruns, Angelika M.; Harms, Margret; Luthje, Holger K. G.; and Matthiessen, Bernd, 4,941,942, Cl. 156-657.000.

Harmstorf, Rudolf, to Harmstorf, Rudolf. Method and an apparatus for moving a rope- or cable-like element through a cable channel pipe. 4,941,774, Cl. 405-158.000.

Harnden, Michael R.; Jarvest, Richard L.; and Geen, Graham R., to Beecham Group p.l.c. Crystalline purine compounds. 4,942,166, Cl. 514-262.000.

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Snyder, Peter A., 4,941,922, Cl. 106-214.000.

Harrell, Sarah R.; and Rowland, John D., to United Technologies Corp. Optical phase detection and control system. 4,942,581, Cl. 372-9.000.

Harrigan, Michael E.: *See*—
Banton, Martin E.; and Harrigan, Michael E., 4,941,721, Cl. 350-6.800.

Harrington, Albert F.: *See*—
Keys, Dalen E.; Smothers, William K.; and Harrington, Albert F., 4,942,102, Cl. 430-1.000.

Harrington, Bruce A.: *See*—
Gupta, Balaram; Saw, Cheng K.; Kenny, Malcolm E.; and Harrington, Bruce A., 4,942,026, Cl. 423-326.000.

Harris, Charles C., to Jetram Sales, Inc. Method and package for fresh cut flower arrangements and plants. 4,941,572, Cl. 206-423.000.

Harris, John L. Flush tank water saver. 4,941,214, Cl. 4-325.000.

Harris, William O.: *See*—
Bergman, Rolf S.; and Harris, William O., 4,942,331, Cl. 313-271.000.

Harrison, Anthony W., to Lucas Industries. Vehicle braking system. 4,941,553, Cl. 188-156.000.

Hart, Colin: *See*—
Fluent, Stewart L.; Hart, Colin; McCree, Charles D.; and Lotsch, Charles F., 4,941,309, Cl. 53-544.000.

Hartel, Volker; Heynemann, Carl; Hundt, Werner; Muller, Siegfried; and Richter, Matthias, to Metzeler GmbH. Annular resilient body made of fiber composite materials. 4,942,075, Cl. 428-109.000.

Harthill, William P., to Honeywell Inc. Sonar projector array drive signal source. 4,942,560, Cl. 367-137.000.

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Harwath, Frank A., to Molex Incorporated. Electrical contact torsion bar systems. 4,941,853, Cl. 439-848.000.

Hasegawa, Atsushi: *See*—
Hanawa, Makoto; Hasegawa, Atsushi; and Nishimukai, Tadahiko, 4,942,521, Cl. 364-200.000.

Hasegawa, Hiroaki: *See*—
Ishikawa, Keiichi; Tsuchiyama, Tadashi; Suzuki, Yasuyuki; and Hasegawa, Hiroaki, 4,941,559, Cl. 192-107.00R.

Hasegawa, Hiroshi, to Olympus Optical Co., Ltd. Endoscope using an optical guide twisted on the tip side to have the visual field direction and curvature axis coincide with each other. 4,941,457, Cl. 128-6.000.

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Sumi, Kazuhiko; Hashimoto, Manabu; Sakane, Yoshikazu; Aita, Kazuo; Sasakura, Masahiro; and Ozaki, Yutaka, 4,942,618, Cl. 382-8.000.

Hashizawa, Shigemi: *See*—
Nagasaka, Yasuhiro; Shiga, Tsuneo; Shiraki, Kazuyuki; Maeda, Akira; Hashizawa, Shigemi; and Ohtaka, Kazuto, 4,941,839, Cl. 439-352.000.

Hassler, Michael: *See*—
Orth, Winfried; Hassler, Michael; Kleffner, Hans W.; and Weiss, Wolfgang, 4,942,239, Cl. 546-290.000.

Hata, Tsunehisa: *See*—
Fujisawa, Yoshikazu; Hata, Tsunehisa; and Hayashi, Tadayoshi, 4,941,669, Cl. 277-235.00R.

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Kitano, Makoto; Kawai, Sueo; Nishimura, Asao; Miura, Hideo; Yaguchi, Akihiro; Kitabayashi, Chikako; Shimizu, Ichio; Hatsuda, Toshio; Ozaki, Toshinori; Hattori, Toshio; and Sakata, Souji, 4,942,452, Cl. 357-68.000.

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Haughton, Gary H., to Evacuo Enterprises Limited. Holder for molten metal sampling device. 4,941,364, Cl. 73-864.530.

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Hauser, Manfred: *See*—
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Shibata, Tatsumi; Hayashi, Hideharu; Muramatsu, Yukio; and Yamamoto, Masaki, 4,942,499, Cl. 361-428.000.

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Hayashi, Shigeyuki: *See*—
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Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.

Hayashi, Tadayoshi: *See*—
Fujisawa, Yoshikazu; Hata, Tsunehisa; and Hayashi, Tadayoshi, 4,941,669, Cl. 277-235.00R.

Hayata, Yoshiki: *See*—
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Hayward Industries, Inc.: *See*—
Tobias, Samuel; Treene, William E.; and Williams, George E., 4,941,217, Cl. 4-542.000.

Hazebrook, Daniel W.; and Hahn, Steven C., to GKN Automotive Inc. Quick disconnect constant velocity universal joint. 4,941,862, Cl. 464-141.000.

Head, Robert A.: *See*—
Conti-Ramsden, John N.; Head, Robert A.; Powell, Richard L.; and Young, Brian D., 4,942,203, Cl. 525-185.000.

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Hedemora AB: *See*—
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Heffner, H. Hugh. Lifting apparatus. 4,941,708, Cl. 297-6.000.

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Lynch, Gregory A., 4,942,613, Cl. 364-557.000.

Heiland, Klaus-Peter, to Barry Controls GmbH. Apparatus for preventing changes of the positions of machines. 4,941,265, Cl. 33-504.000.

Heimeier & Weinlein Fabrik fur Oelhudralik GmbH & Co.K: *See*—
Brunner, Rudolf, 4,941,321, Cl. 60-468.000.

Heimlicher, Peter. Method and circuit for reduction of temperature dependency in an oscillator. 4,942,372, Cl. 331-65.000.

Heinrich, Petra: *See*—
Schrader, Bernhard; Heinrich, Petra; and Wyzgol, Raimund, 4,941,742, Cl. 356-38.000.

Heintz, Harold L. Sailboat room control device. 4,941,420, Cl. 114-102.000.

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Heitmann, Uwe; Lorenzen, Heinz-Christen; Siems, Wolfgang; and Pinck, Peter, to Korber AG. Apparatus for measuring the density of a tobacco stream. 4,941,482, Cl. 131-84.400.

Helms, Cliff, to Dataproducts Corporation. Driving mechanism for reciprocating print shuttle. 4,941,405, Cl. 101-93.040.

Henderson, Graeme B.; Ulrich, Peter C.; and Cerami, Anthony, to Rockefeller University, The. 2-(substituted methylidene)-N-[3-[piperidin-1-yl]propyl]hydrazine carboximidamides useful as antiparasitics. 4,942,170, Cl. 514-326.000.

Henig, Hans. Barrel for electroplating, phosphating and pickling. 4,941,960, Cl. 204-213.000.

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Fleckenstein, Theo; Goebel, Gerd; Carduck, Franz-Josef; Bremus, Norbert; and Eicher, Reinhard, 4,942,266, Cl. 568-864.000.
Guhl, Walter; and Bansemir, Klaus, 4,942,041, Cl. 424-613.000.
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Schmid, Karl H.; Meffert, Alfred; Schenker, Gilbert; and Asbeck, Adolf, 4,942,049, Cl. 426-329.000.

Henn, Manfred; Begerow, Klaus; and Wichert, Volker, to Metallgesellschaft Aktiengesellschaft. Process for decreasing the tendency to form deposits in plants for evaporating spent sulfite liquors. 4,941,946, Cl. 162-36.000.

Hennessy, David R.; and Wenker, Dennis H., to Dana Corporation. Force balanced hydraulic spool valve. 4,941,508, Cl. 137-625.690.

Henny Penny Corporation: *See*—
Moore, David O., 4,941,400, Cl. 99-403.000.

Hensel, Hartmut: *See*—
Gribbin, John D.; Dallmann, Hermann; Engel, Dieter; and Hensel, Hartmut, 4,942,088, Cl. 428-336.000.

Henze, Siegfried; Ziegler, Hans; and Schnaus, Martin, to Texpa Arbter Maschinenbau GmbH. Sewing installation for fabric articles. 4,941,418, Cl. 112-304.000.

Hepar Industries, Inc.: *See*—
Foley, Kevin M.; Griffin, Charles C.; and Amaya, Eduardo, 4,942,156, Cl. 514-56.000.

Herberg, Joseph R.: *See*—
Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., 4,941,577, Cl. 211-70.600.

Herbert, Edward; Repp, John D.; and Cebry, Stephen E., to FMTT, Inc. High frequency matrix transformer power converter module. 4,942,353, Cl. 323-361.000.

Herbst, Donald. Ceiling made of metal panels. 4,941,528, Cl. 165-56.000.

Hergenroeder, Patrick T. Orthopedic casting apparatus. 4,941,463, Cl. 128-83.000.

Herlemann, Werner: *See*—
Ohrle, Rolf; and Herlemann, Werner, 4,941,707, Cl. 296-216.000.

Herndl, Otto; and Schiller, Werner, to Eumuco Aktiengesellschaft fur Maschinenbau. Multi-ram forging assembly. 4,941,342, Cl. 72-402.000.

Hershcovitch, Ady; Kovarik, Vincent J.; and Prelec, Krsto, to United States of America, Energy. Intense steady state electron beam generator. 4,942,339, Cl. 315-111.810.

Hertzberg, Robert P.: *See*—
Dervan, Peter B.; and Hertzberg, Robert P., 4,942,227, Cl. 536-27.000.

Hess, Robert: *See*—
Altemark, Detlef; Hess, Robert; and Hillringhaus, Karl H., 4,941,345, Cl. 73-23.200.

Heuel, Wolfgang; Meyer Zu Bexten, Jobst H.; Muller, Rainer; and Stamm, Klaus, to Hoesch Stahl Aktiengesellschaft. Composite material for vibration damping and structural sound damping. 4,942,080, Cl. 428-212.000.

Hewlett-Packard Company: *See*—
Dody, Jospeh W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 4,942,405, Cl. 346-107.00R.
Gembarowski, Mark L., 4,942,523, Cl. 364-200.000.
Hofer, Gregory V.; and McDonald, James C., 4,942,564, Cl. 369-58.000.
Nazarathy, Moshe; Zorabedian, Paul; Richard, William; and Ranganath, Tirumala R., 4,942,583, Cl. 372-20.000.

Heynemann, Carl: *See*—
Hartel, Volker; Heynemann, Carl; Hundt, Werner; Muller, Siegfried; and Richter, Matthias, 4,942,075, Cl. 428-109.000.

Hi-Tek Polymers, Inc.: *See*—
Langemeier, Paul W.; Phelps, Martha A.; and Morgan, Michael E., 4,941,537, Cl. 166-308.000.

Hibi, Masayuki: *See*—
Funahashi, Yoshiki; and Hibi, Masayuki, 4,941,649, Cl. 267-140.100.

Hickey, Charles F., Jr.; and Thomas, Timothy S., to United States of America, Army. Fabrication of 18% Ni maraging steel laminates by roll bonding. 4,941,927, Cl. 148-11.50Q.

Hicks, Robert C.; and Benyaker, Raymond M. Cleaning system for beverage delivery conduits. 4,941,593, Cl. 222-148.000.

Hickson Corporation: *See*—
Brayman, Theron R.; Pasek, Eugene A.; and Wall, Gregory D., 4,942,064, Cl. 427-297.000.

Hieda, Teruo; Shimizu, Hiroyuki; and Masuda, Kazunori, to Canon Kabushiki Kaisha. Color temperature detecting device for producing a color temperature signal developed using the ratio between color component signals. 4,942,459, Cl. 358-41.000.

Higa, Tatsuo; and Snader, Kenneth M., to Harbor Branch Oceanographic Institution, Inc. Antitumor chamigrene derivatives and their methods of use. 4,942,180, Cl. 514-691.000.

Higgins, Thomas D., III, legal representative: *See*—
Misch, Donald W.; Hagadorn, Irvine R., deceased; Higgins, Thomas D., III, legal representative; Darby, William M.; and Swanson, Murray S., 4,941,631, Cl. 248-178.000.

Highfield, Anthony M., to P.S.M. International PLC. Screw threaded fasteners. 4,941,788, Cl. 411-178.000.

Higuchi, Hisayuki; Suzuki, Makoto; Homma, Noriyuki; and Itoh, Kiyoo, to Hitachi, Ltd. Bi-MOS semiconductor memory having high soft error immunity. 4,942,555, Cl. 365-189.070.

Higuchi, Motohiro: *See*—
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Higurashi, Kunizou: *See*—
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Hildebrand, Karl J.; and Urh, John, to Leeman Labs Inc. Nebulizer employing a fine mesh screen. 4,941,618, Cl. 239-432.000.

Hill, Ira D.; and White, Robert D. Dental stimulator. 4,942,034, Cl. 424-401.000.

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Maier, Elmar, 4,941,783, Cl. 408-204.000.
Soehnlein, Dieter; Wirths, Dieter; Knoller, Anton; and Kunert, Peter, 4,941,339, Cl. 72-189.000.

Hinami, Junji, to NEC Corporation. Display control circuit. 4,942,389, Cl. 340-703.000.

Hiniker, Thomas K.; and Tofte, Semor D., to Micro-Trak Systems, Inc. Ultrasonic velocity sensor. 4,942,558, Cl. 367-91.000.

Hino, Yasuhiko: *See*—
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Hirakouchi, Hiroshi: *See*—
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Hirata, Tetsuo: *See*—
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Hiratsuka, Toshiro: *See*—
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Hirobe, Yoshiaki, to Akebono Brake Industry Co., Ltd. Brake fluid pressure control apparatus in an anti-lock control system. 4,941,712, Cl. 303-115.000.

Hirose, Fumiyasu, to Fujitsu Limited. Gate processor arrangement for simulation processor system. 4,942,615, Cl. 364-578.000.

Hirota, Ryuichi; Tsuruoka, Masatomi; and Inoue, Shinichi, to Yamato Scale Company, Limited. Dispersion feeder. 4,941,565, Cl. 198-601.000.

Hirshberg, Gerald P., to Nissan Design International, Inc. System for aiding a driver's depth perception. 4,941,263, Cl. 33-264.000.

Hisada, Takanori; Maruyama, Takesuke; Deguchi, Masaharu; Noro, Yoshihiko; Honma, Yoshifumi; Ariki, Yoshio; and Taguchi, Shunichi, to Hitachi, Ltd. Light scanning system. 4,941,719, Cl. 350-6.800.

Hissem, Catherine S.: *See*—
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Akimoto, Hajime; Ohba, Shinya; and Ozaki, Toshifumi, 4,942,474, Cl. 358-213.110.
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Higuchi, Hisayuki; Suzuki, Makoto; Homma, Noriyuki; and Itoh, Kiyoo, 4,942,555, Cl. 365-189.070.
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Kitano, Makoto; Kawai, Sueo; Nishimura, Asao; Miura, Hideo; Yaguchi, Akihiro; Kitabayashi, Chikako; Shimizu, Ichio; Hatsuda, Toshio; Ozaki, Toshinori; Hattori, Toshio; and Sakata, Souji, 4,942,452, Cl. 357-68.000.
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Sasaki, Toshio; Aoki, Masakazu; Horiguchi, Masashi; Nakagome, Yoshinobu; Ikenaga, Shinichi; and Masuhara, Toshiaki, 4,942,556, Cl. 365-200.000.
Shintani, Yooichi; Kuriyama, Kazunori; Shonai, Tohru; Kamada, Eiki; and Inoue, Kiyoshi, 4,942,525, Cl. 364-200.000.
Sobue, Masahisa; Okada, Sensuke; Akahori, Kimihiko; Kuniya, Keiichi; Sasaki, Toshimi; Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nihei, Mitsuo, 4,941,251, Cl. 29-132.000.
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Suzuki, Mamoru; Suzuki, Katsumi; Itoh, Kazutoshi; Minato, Akira; Kambayashi, Tsuyoshi; and Hoshino, Yoshiyuki, 4,941,973, Cl. 210-175.000.
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Hitachi Medical Corporation: *See*—
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Hochiki Corporation: *See*—
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Hock, Darryl A., to Jabil Circuit Company. Electromotive sensor. 4,941,348, Cl. 73-119.00A.
Hoechst Aktiengellschaft: *See*—
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Sandow, Jurgen K.; De Felice, Wilfried; Pajunk, Horst; and Pajunk, Heinrich, 4,941,874, Cl. 604-60.000.
Hoechst Celanese Corporation: *See*—
Forschirm, Alex S.; and Davies, Jon H., 4,942,208, Cl. 525-414.000.
Gupta, Balaram; Saw, Cheng K.; Kenny, Malcolm E.; and Harrington, Bruce A., 4,942,026, Cl. 423-326.000.
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Ohsaki, Tsutomu; Sakakibara, Jinsaku; and Kuriki, Takeo, 4,942,143, Cl. 514-222.800.
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Schonafinger, Karl; and Ong, Helen H., 4,942,168, Cl. 514-313.000.
Shutske, Gregory M., 4,942,237, Cl. 546-64.000.
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Heuel, Wolfgang; Meyer Zu Bexten, Jobst H.; Muller, Rainer; and Stamm, Klaus, 4,942,080, Cl. 428-212.000.
Hoeschele, Joerg: *See*—
Steinwandel, Juergen; Hauser, Manfred; and Hoeschele, Joerg, 4,942,057, Cl. 427-38.000.
Hofbauer, August: *See*—
Beer, Michael; Schimko, Philipp; Hofbauer, August; and Kroner, Matthias, 4,941,436, Cl. 123-41.770.
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Cohen, Noal, 4,942,249, Cl. 549-407.000.
Wenger, Jean; Winternitz, Paul; and Zeller, Martin, 4,941,909, Cl. 71-92.000.
Hogue, John. Method for tuning violins. 4,941,383, Cl. 84-275.000.
Holmes, Emerson B. Barbecue flavoring blocks. 4,941,889, Cl. 44-590.000.
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Holtze, Herbert: *See*—
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Walker, Robert L.; and Homan, William E., 4,941,633, Cl. 248-228.000.
Home Courier Corporation: *See*—
Kierowski, John P., 4,941,777, Cl. 406-13.000.
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Akiyama, Eitetsu, 4,941,556, Cl. 192-0.062.
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Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, 4,941,372, Cl. 74-878.000.
Fujisawa, Yoshikazu; Hata, Tsunehisa; and Hayashi, Tadayoshi, 4,941,669, Cl. 277-235.00R.
Hara, Yoshimasa; Ohkura, Seisaku; Iijima, Fumio; Tamura, Isamu; Fukai, Tetsuro; Tagiri, Sumiho; and Takagi, Norimasa, 4,941,794, Cl. 414-341.000.
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Koyama, Hideo; Sasajima, Koji; Maki, Kazuya; Yamaguchi, Kouji; and Ishikawa, Yoshikazu, 4,941,371, Cl. 74-865.000.
Matsumoto, Yoshiyuki; and Kubo, Kanji, 4,941,677, Cl. 280-690.000.
Noguchi, Hiroyuki; Makino, Makoto; and Nye, David M., 4,941,564, Cl. 198-468.200.
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Tabata, Hiroshi; Nakao, Shizuyo; Kinoshita, Yoshihiko; and Katsuki, Atsushi, 4,941,683, Cl. 280-807.000.
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Yamaguchi, Fumihiro; Sayama, Yoshiaki; and Nishida, Takao, 4,941,443, Cl. 123-376.000.
Yamamoto, Hitoshi; Tottori, Takumi; and Toriyama, Masayuki, 4,941,319, Cl. 60-314.000.
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Joyce, Thomas F.; Kelly, Richard P.; Shen, Jian-Kuo; and Raguin, Michel M., 4,942,547, Cl. 364-748.000.
Honeywell Inc.: *See*—
Bartels, James I.; Seidel, Michael J.; and Schimbke, Paul A., 4,941,609, Cl. 236-78.00D.
Harthill, William P., 4,942,560, Cl. 367-137.000.
Lam, Man K.; and Mathias, Milton W., 4,942,383, Cl. 338-42.000.
Hong, Daehyoung: *See*—
Kotzin, Michael D.; Crisler, Kenneth J.; Mohl, Lawrence M.; Saltzberg, Theodore; Hong, Daehyoung; and Van den Heuvel, Anthony P., 4,942,570, Cl. 370-80.000.
Honma, Yoshifumi: *See*—
Hisada, Takanori; Maruyama, Takesuke; Deguchi, Masaharu; Noro, Yoshihiko; Honma, Yoshifumi; Ariki, Yoshio; and Taguchi, Shunichi, 4,941,719, Cl. 350-6.800.
Hook, Bertil: *See*—
Tenerz, Lars; Hook, Bertil; and Engstrom, Thomas, 4,941,473, Cl. 128-637.000.
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Hopkins Manufacturing Corporation: *See*—
Bowden, Wesley E.; and Swan, Michael D., 4,941,844, Cl. 439-425.000.
Hoptner, Wolfgang; Perenthaler, Egbert; and Schwarz, Helmut, to Robert Bosch GmbH. Fuel injection process. 4,941,449, Cl. 123-490.000.
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Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.
Horan, Gerald P.; Wickmann, John T.; and Olak, Richard C., to Chart Industries, Ltd. Adjustable height clamping stand. 4,941,765, Cl. 403-107.000.
Hori, Michio: *See*—
Isobe, Kenji; Hori, Michio; Yoshizawa, Hiroyasu; Ogawa, Kazuo; Takahashi, Hiroyuki; Noguchi, Mitsuo; and Maeda, Toshio, 4,942,099, Cl. 429-35.000.
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Horiguchi, Masashi: *See*—
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Horn, Chris C. Support device for a hose adapter. 4,941,629, Cl. 248-62.000.
Horst, Gary E., to Emerson Electric Co. Pole changing switched reluctance motor and method. 4,942,345, Cl. 318-254.000.
Hosaka, Norio: *See*—
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Hoshino, Yoshiyuki: *See*—
Suzuki, Mamoru; Suzuki, Katsumi; Itoh, Kazutoshi; Minato, Akira; Kambayashi, Tsuyoshi; and Hoshino, Yoshiyuki, 4,941,973, Cl. 210-175.000.
Hosiden Electronics Co., Ltd.: *See*—
Nakamura, Masahiko, 4,941,837, Cl. 439-341.000.
Hosoi, Yuichi: *See*—
Mori, Nobufumi; Hosoi, Yuichi; and Takahashi, Kenji, 4,942,300, Cl. 250-327.200.
Hosokawa, Yoshikazu: *See*—
Konishi, Nobutake; Hosokawa, Yoshikazu; Mimura, Akio; Suzuki, Takaya; Ohwada, Jun-ichi; Kawakami, Hideaki; and Miyata, Kenji, 4,942,441, Cl. 357-23.700.
Hosoya, Nobukazu; Nohara, Kazunori; Ikeguchi, Yasuyuki; Sasaki, Tooru; and Hirao, Yoshichika, to Sanyo Electric Co., Ltd. Peak holding circuit for a color television receiver. 4,942,314, Cl. 307-352.000.
Houssian, Vazgen J., to Eselte Pendaflex Corporation. Spray booth. 4,941,427, Cl. 118-326.000.
Houssian, Vazgen J.: *See*—
Dowzall, Martin E.; and Houssian, Vazgen J., 4,941,520, Cl. 141-114.000.
Hovis, William K. Clothing securing device. 4,941,237, Cl. 24-304.000.
Howald, Ernst: *See*—
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Howard, Ronald F.: *See*—
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Åha, Bjorn, to Kamyr AB. Apparatus for dividing a suspension of fibrous cellulose pulp. 4,941,970, Cl. 209-234.000.
HSC Research Development Corporation: *See*—
Ward, Charles A., 4,941,871, Cl. 600-36.000.
Hsieh, Shan-Tao; and Keller, George E., II, to Union Carbide Chemicals and Plastics Company, Inc. Gas separation by semi-permeable membranes. 4,941,893, Cl. 55-16.000.
Hsu, Juh-San: *See*—
Lin, Huoo-Shuenn; and Hsu, Juh-San, 4,941,700, Cl. 294-99.200.
Hsueh, Fu-Cheng. Fuse holder for flat-type fuse block. 4,941,851, Cl. 439-621.000.
Hubbard, Vance M.; and Brunson, Welton K., to Tecnol, Inc. Face mask with ear loops and method for forming. 4,941,470, Cl. 128-206.130.
Hubbell Incorporated: *See*—
Corsi, Paul J.; Engdahl, Lawrence W.; and Klas, Daniel E., 4,942,271, Cl. 174-101.000.
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Hubner, Henry H., Jr., to Air Techniques Incorporated. Vacuum assembly including an improved vacuum relief valve assembly. 4,941,503, Cl. 137-454.200.
Huetter, Horst, to Messerschmitt-Boelkow-Blohm GmbH. Scatter ammunition container. 4,941,392, Cl. 89-1.510.
Huey-Long, Kou, to China Technical Consultants, Inc. Process for producing α-anthraquinonesulfonic acids and recovering the catalyst used therein. 4,942,251, Cl. 552-234.000.
Hughes Aircraft Company: *See*—
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Maranto, Jack J.; and Moulin, Norbert L., 4,941,727, Cl. 350-96.200.
Hughes Tool Company: *See*—
King, William W., 4,941,538, Cl. 170-329.000.
Hui, Benjamin C.; and Lorberth, Jorg, to CVD Incorporated. Synthesis of phosphorus and arsenic, halides and hydrides. 4,942,252, Cl. 556-70.000.
Hull, Frank A.; Archer, H. Brent; and Frederick, Curt, to Chesley F. Carlson Company. Apparatus for automatically determining the densities of a graphic image. 4,941,746, Cl. 356-444.000.
Hummel, Joseph: *See*—
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Hunter, John A.; Scamans, Geoffrey M.; and O'Callaghan, Wilfred B., to Alcan International Limited. Aluminium batteries. 4,942,100, Cl. 429-50.000.
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Hurt, Floyd R.; and Berger, Lawrence W., to Elder Oil Tools. Anchor device. 4,941,532, Cl. 166-216.000.
Hutchinson, Francis G.: *See*—
Churchill, Jeffrey R.; and Hutchinson, Francis G., 4,942,035, Cl. 424-423.000.
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Hyatt, Gilbert P. Single chip integrated circuit computer architecture. 4,942,516, Cl. 364-200.000.
IAP Research, Inc.: *See*—
Barber, John P., 4,942,378, Cl. 335-216.000.
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Ichimura, Kiyoshi; Ito, Kideaki; Fuse, Masaki; Suematsu, Chiaki; Suzuki, Shingo; and Takahashi, Satoshi, to Mitsubishi Rayon Co., Ltd. Apparatus for following sun light. 4,942,292, Cl. 250-203.400.
Ichiyasu, Koku: *See*—
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Idemitsu Petrochemical Company Limited: *See*—
Takase, Minoru; Ueno, Naoya; and Arashi, Toshimi, 4,941,730, Cl. 350-96.340.
Idzorek, George C.: *See*—
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Igelbuscher, Heinrich: *See*—
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Ihara Chemical Industry Co., Ltd.: *See*—
Suzuki, Toshihiro; and Komatsu, Chizu, 4,942,268, Cl. 570-206.000.
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Hara, Yoshimasa; Ohkura, Seisaku; Iijima, Fumio; Tamura, Isamu; Fukai, Tetsuro; Tagiri, Sumiho; and Takagi, Norimasa, 4,941,794, Cl. 414-341.000.
Iijima, Takashi; Matsui, Takeshi; Kaneto, Shigeru; Horio, Kenji; and Kato, Toshihiko, to Honda Giken Kogyo Kabushiki Kaisha; and Daifuku Co., Ltd. Turntable-using testing apparatus. 4,941,347, Cl. 73-116.000.
Iikawa, Tsutomu: *See*—
Horikoshi, Eiji; Iikawa, Tsutomu; and Sato, Takehiko, 4,941,918, Cl. 75-229.000.
Iimuro, Shigeru; Kitamura, Takashi; and Morimoto, Yoshio, to Mitsui Toatsu Chemicals, Inc. Process for preparing 2,2-bis(4-hydroxyphenyl)propane of high purity. 4,942,265, Cl. 568-724.000.
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Iio, Masahiro; Suzuki, Yoshio; Takayama, Hidehiko; and Sakamoto, Katsumi, to Diesel Kiki Co., Ltd. Sliding-vane rotary compressor. 4,941,810, Cl. 418-15.000.
Ikada, Yoshito: *See*—
Okada, Masao; Sakai, Kazuhiko; Kimura, Haruo; and Ikada, Yoshito, 4,941,870, Cl. 600-36.000.
Ikawa, Kazuo, to Canon Kabushiki Kaisha. Arrangement for displaying operation of booster circuit for flash device camera. 4,942,340, Cl. 315-241.00P.
Ikeda Bussan Company Ltd.: *See*—
Fujiwara, Mikio; and Komohara, Minoru, 4,941,636, Cl. 248-430.000.
Kimura, Syuzaburo, 4,941,648, Cl. 267-131.000.
Ikeda, Junji: *See*—
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Ikeda, Yasuhiro, to Shin-Etsu Handotai Co., Ltd. RF induction heating apparatus for floating-zone melting. 4,942,279, Cl. 219-10.750.

Ikeguchi, Yasuyuki: *See*—
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Ikematsu, Takenosuke: *See*—
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Ilco Unican Inc.: *See*—
Fish, Aaron M.; and Somasundaram, Hariharan, 4,941,334, Cl. 70-214.000.
Illinois Tool Works, Inc.: *See*—
Briggs, Paul C.; and Gosiewski, Donald E., 4,942,201, Cl. 525-71.000.
Ilott, Jan. Nozzle for spraying equipment. 4,941,614, Cl. 239-294.000.
Imagawa, David T.; Lee, Moon H.; and Sano, Kouichi, to Research Education Institute, Inc. Aids prognosis test detecting the presence of antibodies inhibiting HIV reverse transcriptase. 4,942,122, Cl. 435-5.000.
Imai, Akira: *See*—
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Imai, Masafumi: *See*—
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Imai, Tomoyuki: *See*—
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Imbert, Michel; and Merval, Jean-Marc, to SGS-Thomson Microelectronics S.A. Detection circuit for a video tape recorder signal. 4,942,472, Cl. 358-188.000.
Imbert, Thierry: *See*—
Moinet, Gerard; and Imbert, Thierry, 4,942,221, Cl. 558-408.000.
Imperial Chemical Industries: *See*—
Churchill, Jeffrey R.; and Hutchinson, Francis G., 4,942,035, Cl. 424-423.000.
Imperial Chemical Industries PLC: *See*—
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Conti-Ramsden, John N.; Head, Robert A.; Powell, Richard L.; and Young, Brian D., 4,942,203, Cl. 525-185.000.
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Inagaki, Yukihiko; Masuda, Yoshikazu; Sasada, Shigeru; Katsuyama, Mikizo; and Tanaka, Hirohisa, to Dainippon Screen Mfg. Co., Ltd. Method of and apparatus for recording a halftone dot color image on a color photosensitive material. 4,942,460, Cl. 358-75.000.
Inagawa, Konosuke: *See*—
Watanabe, Kazuhiro; Saito, Kazuya; Yuchi, Yoshiyuki; and Inagawa, Konosuke, 4,941,430, Cl. 118-723.000.
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Innovec, Inc.: *See*—
Kemper, Alicia W., 4,941,226, Cl. 15-185.000.
Inoue, Hiroshi; Yokono, Wataru; and Okuda, Yasuji, to Sakura Color Products Corp. Water base pigment ink compositions for use in marking pens. 4,942,185, Cl. 521-54.000.
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Inoue, Noboru, to Inoue, Noboru. Electrostatic adsorptive fluid filtering apparatus. 4,941,962, Cl. 204-302.000.
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Intelligent Surgical Lasers Inc.: *See*—
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Baker, William T., Jr.; Buffum, Charles M.; Jolissaint, Charles H.; and Kerlin, Gregg W., 4,942,602, Cl. 379-212.000.
Beranger, Herve ; Brunin, Armand; Caplier, Bruno; and Rousseau, Jean-Paul, 4,942,316, Cl. 307-455.000.
Buchholtz, Timothy C.; Gruver, Michael R.; Richetta, Raymond A.; and Schmerbeck, Timothy J., 4,942,399, Cl. 341-143.000.
Couden, Donald V.; Karr, Paul C.; and Balliet, Layton, 4,941,724, Cl. 350-96.180.
Do, Phuc K.; Kellam, Karen K.; Tong, Ronnie Chi-on; Willis, Ronald W.; and Wyke, Carol E., 4,942,390, Cl. 340-735.000.
Estes, Mark W.; Eisen, Ivan R.; and Peters, Anthony M., 4,941,829, Cl. 434-118.000.
Fowler, Alan B.; and Timp, Gregory L., 4,942,437, Cl. 357-16.000.
Ishihara, Takeyuki; and Kanno, Tetsuo, 4,941,377, Cl. 83-211.000.
Lasmayoux, Casimir; and Pantani, Antoine, 4,941,835, Cl. 439-152.000.
Moreau, Wayne M.; Chiong, Kaolin N.; Chow, Ming-Fea; and Snyder, Nancy W., 4,942,108, Cl. 430-169.000.
Picard, Jean-Louis, 4,942,572, Cl. 370-85.800.
Tkazyik, William J.; and Urfer, Robert G., 4,941,830, Cl. 439-59.000.
Vassiliadis, Stamatis, 4,942,548, Cl. 364-784.000.
Wickramasinghe, Hemantha K., 4,941,753, Cl. 374-120.000.
International Flavors & Fragrances Inc.: *See*—
Buckholz, Lawrence L., Jr.; and Kasper-Lehmann, Robin, 4,942,047, Cl. 426-302.000.
International Sanitary Ware Manufacturing Cy, S.A.: *See*—
Van Marcke, Karel C., 4,941,219, Cl. 4-623.000.
Inui, Tsutomu; Matsumoto, Shun-ichiro; Ichiyasu, Rokuo; and Mizuguchi, Takeo, to Hitachi Metals, Ltd. Sintered target member and method of producing same. 4,941,920, Cl. 75-246.000.
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Tsukamoto, Katsuhiro; Inuishi, Masahide; and Shimizu, Masahiro, 4,942,448, Cl. 357-49.000.
Iowa State University Research Foundation, Inc.: *See*—
Martin, Steve W., 4,942,144, Cl. 501-40.000.
Ippolito, Robert: *See*—
Specht, Brian; and Ippolito, Robert, 4,941,369, Cl. 74-551.900.
Irinoda, Kazuhiko: *See*—
Nakazawa, Hitoshi; Ohtsuka, Mari; Matsuda, Hideaki; Katori, Tatsuhiko; and Irinoda, Kazuhiko, 4,942,172, Cl. 514-441.000.
Irwin, Guy L. Spiral conveyor with textured capstan. 4,941,566, Cl. 198-778.000.
Irwin Toy Limited: *See*—
Frauca, Vicente T., 4,941,610, Cl. 238-10.00A.
Iseler, Kenneth A.; and Wilkinson, Robert E., to Budd Company, The. Method for bonding reinforcement members to FRP panels. 4,941,937, Cl. 156-274.800.
Iseler, Kenneth A.: *See*—
Wilkinson, Robert E.; Iseler, Kenneth A.; Smith, Rueben L.; Duerr, Lorenz K. E.; and Cargile, Harry M., 4,941,936, Cl. 156-274.800.
Ishibashi, Masahiro: *See*—
Tanaka, Yasunori; Kobayashi, Teruo; and Ishibashi, Masahiro, 4,942,317, Cl. 307-465.000.
Ishida, Kazuhito: *See*—
Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.
Ishida, Noboru: *See*—
Suzuki, Osamu; and Ishida, Nobora, 4,941,760, Cl. 384-537.000.
Ishida, Tokuji: *See*—
Norita, Toshio; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Taniguchi, Nobuyuki, 4,942,418, Cl. 354-408.000.
Ishida, Yoshihiro; Iinuma, Yoshio; and Ichikawa, Shingo, to Citizen Watch Co., Ltd. IC package. 4,942,453, Cl. 357-68.000.
Ishihara, Takeyuki; and Kanno, Tetsuo, to International Business Machines Corporation. Apparatus for feeding a continuous form and cutforms. 4,941,377, Cl. 83-211.000.
Ishii, Yoshihiko, to Nissan Motor Co., Ltd. Select shock attenuation arrangement for automatic automotive transmission. 4,941,370, Cl. 475-128.000.
Ishikawa, Hiroyuki; and Koizumi, Hiroyasu, to Calsonic Corporation. Method for welding metal honeycomb carrier. 4,942,285, Cl. 219-121.640.
Ishikawa, Keiichi; Tsuchiyama, Tadashi; Suzuki, Yasuyuki; and Hasegawa, Hiroaki. Wet friction member, and wet frictional engagement apparatus for a transmission using the same. 4,941,559, Cl. 192-107.00R.
Ishikawa, Sakae: *See*—
Nakai, Junji; and Ishikawa, Sakae, 4,942,434, Cl. 355-290.000.
Ishikawa, Yoshikazu: *See*—
Koyama, Hideo; Sasajima, Koji; Maki, Kazuya; Yamaguchi, Kouji; and Ishikawa, Yoshikazu, 4,941,371, Cl. 74-865.000.
Ishikawa, Youhei; Tsunoda, Kikuo; Hiratsuka, Toshiro; and Abe, Hirotsugu, to Murata Manufacturing Co., Ltd. Rod type dielectric resonating device with coupling plates. 4,942,377, Cl. 333-202.000.
Ishimaru, Hajima: *See*—
Saeki, Hiroshi; Ikeda, Junji; and Ishimaru, Hajime, 4,941,224, Cl. 15-1.50R.
Ishimaru, Hajime: *See*—
Saeki, Hiroshi; Ikeda, Junji; and Ishimaru, Hajime, 4,941,224, Cl. 15-1.50R.
Ishimura, Yoshimasa; Oe, Takami; Suyama, Yuseki; and Nagato, Nobuyuki, to Showa Denko Kabushiki Kaisha. Process for preparation of allyl type amine. 4,942,261, Cl. 564-480.000.

Ishiwata, Syousuke: *See*—
Suzuki, Osamu; Ishiwata, Syousuke; Hayashi, Mitsuroh; and Oshima, Hideaki, 4,941,346, Cl. 73-54.000.

Ishizaka, Yukio: *See*—
Sotogoshi, Teruhito; Ishizaka, Yukio; and Nakamura, Katsunori, 4,941,923, Cl. 106-498.000.

Isobe, Kenji; Hori, Michio; Yoshizawa, Hiroyasu; Ogawa, Kazuo; Takahashi, Hiroyuki; Noguchi, Mitsuo; and Maeda, Toshio, to Kabushiki Kaisha Toshiba. Fuel cell. 4,942,099, Cl. 429-35.000.

Isomura, Shohei: *See*—
Arai, Shigeyoshi; Sugita, Kyoko; Isomura, Shohei; and Kaetsu, Hayato, 4,941,956, Cl. 204-157.200.

Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Coaxial type starter device. 4,941,366, Cl. 74-6.000.

Isozumi, Shuzoo: *See*—
Morishita, Akira; and Isozumi, Shuzoo, 4,942,307, Cl. 290-38.00R.

Ito, Hideo; and Yokote, Masatsugu, to Nissan Motor Co., Ltd. Device for distributing drive power in the drive train of a four wheel drive vehicle. 4,941,541, Cl. 180-140.000.

Ito, Hiroyasu: *See*—
Furuhashi, Kenshi; Ito, Hiroyasu; and Enar[illegible]u, 4,942,273, Cl. 200-61.540.

Ito, Kideaki: *See*—
Ichimura, Kiyoshi; Ito, Kideaki; Fuse, Masaki; Suematsu, Chiaki; Suzuki, Shingo; and Takahashi, Satoshi, 4,942,292, Cl. 250-203.400.

Ito, Toshikazu; and Kagohata, Tsuseo, to Hitachi, Ltd. Automotive air conditioner. 4,941,525, Cl. 165-12.000.

Itoh, Hiroyuki; Yamada, Toshio; Masaki, Akira; and Kobayashi, Tohru, to Hitachi, Ltd. Transistor circuit with improved α ray resistant properties. 4,942,320, Cl. 307-546.000.

Itoh, Kazutoshi: *See*—
Suzuki, Mamoru; Suzuki, Katsumi; Itoh, Kazutoshi; Minato, Akira; Kambayashi, Tsuyoshi; and Hoshino, Yoshiyuki, 4,941,973, Cl. 210-175.000.

Itoh, Kiyoo: *See*—
Higuchi, Hisayuki; Suzuki, Makoto; Homma, Noriyuki; and Itoh, Kiyoo, 4,942,555, Cl. 365-189.070.

Itoh, Masataka: *See*—
Yoshinouchi, Atsushi; Itoh, Masataka; Tsuchimoto, Shuhei; Tarui, Keiji; and Nishigaki, Satoshi, 4,942,481, Cl. 358-471.000.

Itoh, Takaaki: *See*—
Tomoda, Atsuo; Itoh, Takaaki; and Kijima, Takao, 4,941,542, Cl. 180-140.000.

Itozaki, Hideo; Tanaka, Saburo; Fujita, Nobuhiko; Yazu, Shuji; and Jodai, Tetsuji, to Sumitomo Electric Industries Ltd. Superconducting thin film and a method for preparing the same. 4,942,142, Cl. 505-1.000.

Itozaki, Hideo; Harada, Keizo; and Yazu, Shuji, to Sumitomo Electric Industries, Ltd. Process for preparing a bismuth-type compound oxide superconductor. 4,942,152, Cl. 505-1.000.

ITT Corporation: *See*—
Sterns, William G., 4,942,376, Cl. 333-160.000.
Welsh, David E., 4,941,847, Cl. 439-595.000.

Ivey, Paul C.; and Owen, John M., to Rolls-Royce plc; and Ruston Gas Turbines Limited. Nose bullet anti-icing for gas turbine engines. 4,941,317, Cl. 60-39.093.

Ivy Hill Corporation: *See*—
Friedman, Herbert, 4,941,575, Cl. 206-621.300.

Iwama, Satoshi: *See*—
Yoshida, Yasunori; Nakayama, Rinichi; and Iwama, Satoshi, 4,942,197, Cl. 524-496.000.

Iwamoto, Yasuhiko. Handy bookbinder. 4,941,791, Cl. 412-19.000.

Iwashita, Shinichi, to NEC Corporation. Semiconductor memory device having non-volatile memory transistors. 4,942,450, Cl. 357-54.000.

Jabil Circuit Company: *See*—
Hock, Darryl A., 4,941,348, Cl. 73-119.00A.

Jackson, Adam; Scrowston, Richard M.; Gray, George W.; Lacey, David; and Toyne, Kenneth J., to United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the. N-substituted amino acid derivatives for use in liquid crystal materials and devices. 4,941,992, Cl. 252-299.660.

Jager, Harald. Guitar. 4,941,384, Cl. 84-313.000.

Janos, Frantisek; Storek, Josef; and Krepelka, Ladislav, to Obuvnicky prumysl SVIT statni podnik. Cross country skiing boot. 4,941,274, Cl. 36-117.000.

Japan Automatic Transmission Co., Ltd.: *See*—
Boda, Keiji; Waki, Kouichirou; Niide, Kazuo; Yokota, Hiroaki; Yanaginawa, Keizo; and Takeuchi, Hokuto, 4,942,530, Cl. 364-424.100.

Japan Electronic Control Systems Co., Ltd.: *See*—
Nakaniwa, Shinpei; and Tomisawa, Naoki, 4,941,448, Cl. 123-488.000.

Japan Medical Supply Co., Ltd.: *See*—
Okada, Masao; Sakai, Kazuhiko; Kimura, Haruo; and Ikada, Yoshito, 4,941,870, Cl. 600-36.000.

Japan Radio Co., Ltd.: *See*—
Sai, Kenji, 4,942,374, Cl. 332-124.000.

Japan Synthetic Rubber Company, Ltd.: *See*—
Kawata, Takashi; Katsumata, Hideo; Makino, Kenya; and Chikatsu, Yoshishige, 4,942,187, Cl. 523-200.000.
Zama, Yoshiaki; Umeda, Itsuki; Takemura, Yasuhiko; Takashima, Masaaki; Furubushi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Yoshida, Hiromichi, 4,942,202, Cl. 525-104.000.

Jaquet Orthopedie, S.A.: *See*—
Wagenknecht, Marcel, 4,941,481, Cl. 606-59.000.

Jardin, Hans, to Webasto AG Fahrzeugtechnik. Vehicle roof. 4,941,706, Cl. 296-213.000.

Jarosak, Robert D. Lawn mower attachment. 4,941,231, Cl. 15-328.000.

Jartoux, Pierre, to Freyssinet International (STUP). Anchoring devices for tensile braces. 4,941,303, Cl. 52-223.00L.

Jarvest, Richard L.: *See*—
Harnden, Michael R.; Jarvest, Richard L.; and Geen, Graham R., 4,942,166, Cl. 514-262.000.

Jensen, Thomas H., to PPG Industries, Inc. Novel fiber-forming bushing and tip plate. 4,941,903, Cl. 65-1.000.

Jensen, Wayne P., to Hughes Aircraft Company. Split heater bar. 4,942,282, Cl. 219-85.160.

Jetram Sales, Inc.: *See*—
Harris, Charles C., 4,941,572, Cl. 206-423.000.

Jitschin, Wolfgang; and Rohl, Peter, to Physikalisch-Technische Bundesanstalt. Transporter for a rotor of a gas friction manometer. 4,941,351, Cl. 73-431.000.

Jobmann, Wolfgang. Rotary opener and closer for screws, screw closures on bottles, jars and the like. 4,941,373, Cl. 81-3.400.

Jochum, Peter: *See*—
Ehmig, Gerhard; Jochum, Peter; and Maurer, Erich, 4,941,391, Cl. 89-1.140.

Jodai, Tetsuji: *See*—
Itozaki, Hideo; Tanaka, Saburo; Fujita, Nobuhiko; Yazu, Shuji; and Jodai, Tetsuji, 4,942,142, Cl. 505-1.000.

Joder, Andreas: *See*—
Renggli, Franz; and Joder, Andreas, 4,942,310, Cl. 307-271.000.

Johannes Heidenhain GmbH: *See*—
Brunner, Arthur; and Mitterreiter, Johann, 4,942,295, Cl. 250-231.130.

Johannesburg Construction Corporation (Proprietary) Limited: *See*—
Bock, Immo E.; Nathan, Philip L.; and Malpage, Peter O., 4,941,843, Cl. 439-425.000.

Johansen, Trond V.; Ruch, Ola; Naess, Ludvig; Kristjansson, K. P.; and Utengen, S. F., to Den norske stats oljeselskap a.s. Device with a valve function. 4,941,511, Cl. 138-89.000.

Johansson, Lars-Erik J: *See*—
Gustavsson, Lennart; Lindau, Leif; and Johansson, Lars-Erik J, 4,941,896, Cl. 55-95.000.

John Fluke Mfg. Co., Inc.: *See*—
Gessaman, Bill; Lantz, Paul; and Parle, Jon, 4,942,401, Cl. 341-157.000.

John, Gunther, to Minnesota Mining and Manufacturing Company. Method for sealing a cable bundle in longitudinal direction. 4,941,932, Cl. 156-48.000.

Johnson, Charles R. Identity card. 4,941,686, Cl. 283-87.000.

Johnson, Conrad O. Tone plate and clamping device for a musical instrument mouthpiece. 4,941,385, Cl. 84-383.00R.

Johnson, Gary M.: *See*—
Busack, Jon P.; Johnson, Gary M.; and Clem, Richard R., 4,942,576, Cl. 371-21.200.

Johnson, Harry: *See*—
Anic, Jure; Dederichs, Walburga; Huybrechts, Lucas E. A.; and Johnson, Harry, 4,941,921, Cl. 106-213.000.

Johnson & Johnson: *See*—
Korpman, Ralf, 4,941,933, Cl. 156-160.000.

Johnson & Johnson Medical, Inc.: *See*—
Williams, Harold R.; and Spencer, Robert M., 4,941,518, Cl. 141-1.000.

Johnson, Kirstina M.: *See*—
Moddel, Garret R.; and Johnson, Kirstina M., 4,941,735, Cl. 350-342.000.

Johnson, Roger A.: *See*—
Karlotski, Robert J.; Sentementes, Thomas J.; and Johnson, Roger A., 4,942,330, Cl. 313-25.000.

Johnson, Stanley A.; Reedy, Gerald T.; and Kumar, Romesh, to United States of America, Energy. Real time infrared aerosol analyzer. 4,942,297, Cl. 250-304.000.

Jolissaint, Charles H.: *See*—
Baker, William T., Jr.; Buffum, Charles M.; Jolissaint, Charles H.; and Kerlin, Gregg W., 4,942,602, Cl. 379-212.000.

Jolly, Scott T., to Lubrizol Corporation, The. Liquid compositions containing organic nitro compounds. 4,941,986, Cl. 252-51.50R.

Jones, Bradley T.: *See*—
Winefordner, James D.; and Jones, Bradley T., 4,942,134, Cl. 436-161.000.

Jones, David S., to VG Instruments Group Limited. Super-critical fluid mass spectrometer. 4,942,296, Cl. 250-288.000.

Jones, Robert S.; and Maurer, John J., to Eastman Kodak Company. Cover sheet cleaning means for a contact printer. 4,942,426, Cl. 355-84.000.

Jones, Truman. Periodic event recorder. 4,941,688, Cl. 283-72.000.

Joseph Fisher: *See*—
Fisher, Joseph, 4,941,476, Cl. 128-719.000.

Josephson, Daniel M.: *See*—
Winn, Donald G.; and Josephson, Daniel M., 4,941,660, Cl. 272-76.000.

Joyce, Thomas F.; Kelly, Richard P.; Shen, Jian-Kuo; and Raguin, Michel M., to Honeywell Bull, Inc. Multiprocessors on a single semiconductor chip. 4,942,547, Cl. 364-748.000.

JP Laboratories, Inc.: *See*—
Patel, Gordhanbhai N.; Bolikal, Durgadas; and Bellemare, Richard A., 4,941,940, Cl. 156-628.000.

Juenkersfeld, Harald: *See*—
Proepper, Wilhelm; Juenkersfeld, Harald; and Fischer, Georg, 4,941,562, Cl. 198-416.000.
Julian, Randall K., to Sunbeam Plastics Corporation. Dispensing closure. 4,941,580, Cl. 215-235.000.
Julian, Randall K., to Sunbeam Plastics Corporation. Injection-blow molding apparatus. 4,941,815, Cl. 425-525.000.
Jung, Johann: *See*—
Buschmann, Ernst; Sproesser, Linhard; Zeeh, Bernd; Jung, Johann; Rademacher, Wilhelm; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,942,244, Cl. 548-268.200.
Justrite Manufacturing Company: *See*—
Flider, Frank S., 4,941,588, Cl. 220-302.000.
Jutand, Francis; and Montperrus, Luc, to Etat Francais represente par le Ministere des Postes, des Telecommunications et de l'Espace (CNET). Recursive adder for calculating the sum of two operands. 4,942,549, Cl. 364-786.000.
Jutteau, Jacques: *See*—
Bhargava, Hridaya; and Jutteau, Jacques, 4,942,042, Cl. 424-683.000.
K & A Tool Company: *See*—
Arendt, Timothy R., 4,941,768, Cl. 403-331.000.
Kabushiki Kaisha Kenwood: *See*—
Terada, Hisashi, 4,942,590, Cl. 375-1.000.
Kabushiki Kaisha Kobe Seiko Sho: *See*—
Sakamoto, Yujiro; Kurosaka, Toshio; Fukumoto, Hirohiko; Miyake, Toshiya; and Tokunaga, Hirohiko, 4,941,628, Cl. 244-12.200.
Kabushiki Kaisha Machida Seisakusho: *See*—
Watanabe, Yoshio; and Chikama, Toshio, 4,941,455, Cl. 128-4.000.
Kabushiki Kaisha Matsuyama Seisakusho: *See*—
Sakao, Masahito, 4,941,639, Cl. 248-549.000.
Kabushiki Kaisha Tokai-Rika-Denki Seisakusho: *See*—
Furuhashi, Kenshi; Ito, Hiroyasu; and Enari, Nobuyuki, 4,942,273, Cl. 200-61.540.
Kabushiki Kaisha Toshiba: *See*—
Isobe, Kenji; Hori, Michio; Yoshizawa, Hiroyasu; Ogawa, Kazuo; Takahashi, Hiroyuki; Noguchi, Mitsuo; and Maeda, Toshio, 4,942,099, Cl. 429-35.000.
Kanno, Masayuki, 4,942,479, Cl. 358-448.000.
Kohno, Yoshiaki, 4,942,512, Cl. 364-133.000.
Maeno, Junichi, 4,942,569, Cl. 370-60.000.
Nakagawara, Chikashi; Murayama, Akihiro; and Nakamura, Shigeru, 4,942,369, Cl. 330-296.000.
Sako, Shigeki, 4,942,456, Cl. 357-72.000.
Shigehara, Hiroshi, 4,942,608, Cl. 381-43.000.
Tanaka, Yasunori; Kobayashi, Teruo; and Ishibashi, Masahiro, 4,942,317, Cl. 307-465.000.
Tsuda, Yukio, 4,942,406, Cl. 346-108.000.
Yakushiji, Shigenori, 4,942,446, Cl. 357-38.000.
Yamamuro, Mikio, 4,942,563, Cl. 369-44.110.
Kabushikikaisha Topcon: *See*—
Ohishi, Masahiro; and Ohtomo, Fumio, 4,942,561, Cl. 369-118.000.
Kadowaki, Nobuo: *See*—
Yatsuka, Takeshi; Yamazoe, Seiji; Hirakouchi, Hiroshi; Mizumura, Yutaka; Endo, Hiroshi; and Kadowaki, Nobuo, 4,942,219, Cl. 528-272.000.
Kaetsu, Hayato: *See*—
Arai, Shigeyoshi; Sugita, Kyoko; Isomura, Shohei; and Kaetsu, Hayato, 4,941,956, Cl. 204-157.200.
Kafka, James D.: *See*—
Kintz, Gregory J.; Baer, Thomas M.; and Kafka, James D., 4,942,582, Cl. 372-18.000.
Kageyama, Minoru: *See*—
Kawai, Makoto; Nakamura, Kazuhito; and Kageyama, Minoru, 4,941,397, Cl. 92-223.000.
Kageyama, Shunji: *See*—
Kojima, Tadao; Kageyama, Shunji; Okada, Minoru; Ohata, Isao; and Sato, Noboru, 4,942,242, Cl. 548-192.000.
Kagohata, Tsuneo: *See*—
Ito, Toshikazu; and Kagohata, Tsuneo, 4,941,525, Cl. 165-12.000.
Kaiser, Roger A.; Nuckols, James H.; Emerson, Theodore F.; and Brasher, Gary L., to Compaq Computer Corporation. Computer with improved keyboard password functions. 4,942,606, Cl. 380-4.000.
Kajiwara, Makoto; Onodera, Kaoru; Kimura, Toshio; and Komorita, Kazuo, to Konishiroku Photo Industry Co., Ltd. Silver halide photographic light-sensitive material. 4,942,121, Cl. 430-583.000.
Kajiwara, Toshiyuki: *See*—
Sobue, Masahisa; Okada, Sensuke; Akahori, Kimihiko; Kuniya, Keiichi; Sasaki, Toshimi; Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nihei, Mitsuo, 4,941,251, Cl. 29-132.000.
Kakinami, Toshiaki; and Hamajima, Shigemitsu, to Aisin Seiki Kabushiki Kaisha. Mobile range finder. 4,942,533, Cl. 364-449.000.
Kakinuma, Koichiro; and Watanabe, Minoru, to Sony Corporation. Automatic page-turning device. 4,942,482, Cl. 358-474.000.
Kakio, Motoaki: *See*—
Arakawa, Hajime; Yamaoka, Osamu; Kubota, Kazuyuki; Kakio, Motoaki; Azuma, Yoshimasa; and Nagashima, Mitsuru, 4,942,496, Cl. 361-321.000.
Kakitani, Yohtaro, to Ricoh Company, Ltd. Image recording apparatus with a removable developing unit. 4,942,429, Cl. 355-208.000.
Kakiuchi, Hajime: *See*—
Noguchi, Toru; Takada, Toshimichi; Yonezaki, Takahiro; Yamaguchi, Yoshio; Kakiuchi, Hajime; Deki, Shigehito; Goto, Kazuo; Miyata, Hitoshi; and Mashimo, Satoshi, 4,941,961, Cl. 204-294.000.
Kakuta, Takuya: *See*—
Tanaka, Norio; Kakuta, Takuya; Oya, Eiichi; and Baba, Masatoshi, 4,942,246, Cl. 548-367.000.
Kamada, Eiki: *See*—
Shintani, Yooichi; Kuriyama, Kazunori; Shonai, Tohru; Kamada, Eiki; and Inoue, Kiyoshi, 4,942,525, Cl. 364-200.000.
Kambayashi, Tsuyoshi: *See*—
Suzuki, ..iamoru; Suzuki, Katsumi; Itoh, Kazutoshi; Minato, Akira; Kambayashi, Tsuyoshi; and Hoshino, Yoshiyuki, 4,941,973, Cl. 210-175.000.
Kamimura, Kuniaki; Sawada, Kenji; and Yamade, Yasushi, to Minolta Camera Kabushiki Kaisha. Microfilm image processing apparatus. 4,942,425, Cl. 355-45.000.
Kamimura, Yasuo; Ohmori, Toshiaki; Yanagi, Motonori; Fukumoto, Takaaki; and Hama, Masaharu, to Dan Science Co., Ltd.; and Mitsubishi Denki Kabushiki Kaisha. Carrier cleaning and drying apparatus. 4,941,489, Cl. 134-95.000.
Kamman, Kenneth R.: *See*—
Weber, Robert L.; Kamman, Kenneth R.; Ballheimer, Benny; and Shoup, Stephen G., 4,941,440, Cl. 123-193.00P.
Kamyr AB: *See*—
Ahs, Bjorn, 4,941,970, Cl. 209-234.000.
Kanai, Toshio, to Matsushita Electric Industrial Co., Ltd. Picture display apparatus. 4,942,469, Cl. 358-153.000.
Kanbe, Junichiro: *See*—
Taniguchi, Osamu; Kanbe, Junichiro; Okada, Shinjiro; Tsuboyama, Akira; and Enari, Masahiko, 4,941,736, Cl. 350-350.00S.
Kandler, Walter: *See*—
Seidel, Werner; and Kandler, Walter, 4,941,248, Cl. 29-564.600.
Kanemaru, Tetsuro: *See*—
Takai, Hideyuki; and Kanemaru, Tetsuro, 4,942,106, Cl. 430-72.000.
Kanemitsu, Yoichi. Radial magnetic bearing system. 4,942,321, Cl. 310-90.500.
Kaneto, Shigeru: *See*—
Iijima, Takashi; Matsui, Takeshi; Kaneto, Shigeru; Horio, Kenji; and Kato, Toshihiko, 4,941,347, Cl. 73-116.000.
Kanser, Donald R. Marketing display device. 4,941,276, Cl. 40-538.000.
Kanno, Masayuki, to Kabushiki Kaisha Toshiba. Image information processing apparatus. 4,942,479, Cl. 358-448.000.
Kanno, Tetsuo: *See*—
Ishihara, Takeyuki; and Kanno, Tetsuo, 4,941,377, Cl. 83-211.000.
Kanzaka, Yoshihiro: *See*—
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Benfaremo, Nicholas; Kapuscinski, Maria M.; and Nalesnik, Theodore E., 4,941,985, Cl. 252-51.50R.
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Karasaki, Toshihiko: *See*—
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Karibe, Norio: *See*—
Sugimoto, Hachiro; Nakamura, Takaharu; Tsuchiya, Yutaka; Sugumi, Hiroyuki; Higurashi, Kunizou; Karibe, Norio; Yamanishi, Yoshiharu; Ogura, Hiroo; Araki, Shin; Kubota, Atsuhiko; Ohtake, Michiko; and Tamatsu, Kiyomi, 4,942,169, Cl. 514-318.000.
Kariya, Yoshinobu: *See*—
Uematsu, Ryosuke; Shindo, Kazunori; Kariya, Yoshinobu; and Oikawa, Shinro, 4,942,475, Cl. 355-256.000.
Karlotski, Robert J.; Sentementes, Thomas J.; and Johnson, Roger A., to GTE Products Corporation. Lamp assembly utilizing shield and ceramic fiber mesh for containment. 4,942,330, Cl. 313-25.000.
Karlsson, Ingvar, to Casco Nobel AB. Method of joining materials. 4,941,938, Cl. 156-281.000.
Karol, Frederick J.; Sun-Chueh, Kao; and Drage, James S., to Union Carbide Chemicals and Plastics Company, Inc. Catalyst system containing an autoacceleration inhibitor. 4,942,147, Cl. 502-113.000.
Karr, Paul C.: *See*—
Couden, Donald V.; Karr, Paul C.; and Balliet, Layton, 4,941,724, Cl. 350-96.180.
Kasai, Hiroshi; and Kawamoto, Yuji, to Toyo Engineering Corporation. Catalytic reactor. 4,942,022, Cl. 422-201.000.
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Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 4,942,212, Cl. 528-28.000.
Kashiwaba, Satoshi; and Makajima, Masahiro, to NEC Corporation. Phase-locked loop having improved input jitter characteristics. 4,942,371, Cl. 331-14.000.
Kasper, Frank S., to AMCA International Corporation. Slice thickness control for an automatic slicing machine. 4,941,375, Cl. 83-23.000.
Kasper-Lehmann, Robin: *See*—
Buckholz, Lawrence L., *Jr.*; and Kasper-Lehmann, Robin, 4,942,047, Cl. 426-302.000.
Kastendieck, Keith G. Composition and method for cleaning and sanitizing the teats of milk producing animals. 4,942,177, Cl. 514-560.000.
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Okajima, Atsushi; Yamano, Fumiyuki; and Katagiri, Eri, 4,942,526, Cl. 364-419.000.

Katayama, Shinji: *See*—
Shiraishi, Motoatsu; Sasagawa, Masaru; Tazo, Ken; Kubota, Masaaki; and Katayama, Shinji, 4,941,793, Cl. 414-225.000.

Katayama, Susumu: *See*—
Yamauchi, Kazumasa; and Katayama, Susumu, 4,942,384, Cl. 340-522.000.

Kato, Hideo, to Futaba Denshi Kogyo Kabushiki Kaisha. Clicked key board switch. 4,942,276, Cl. 200-517.000.

Kato, Keiichi: *See*—
Kumagai, Motoo; Kato, Keiichi; Nagano, Masato; and Sakaguchi, Michiaki, 4,942,079, Cl. 428-209.000.

Kato, Toshihiko: *See*—
Iijima, Takashi; Matsui, Takeshi; Kaneto, Shigeru; Horio, Kenji; and Kato, Toshihiko, 4,941,347, Cl. 73-116.000.

Katori, Tatsuhiko: *See*—
Nakazawa, Hitoshi; Ohtsuka, Mari; Matsuda, Hideaki; Katori, Tatsuhiko; and Irinoda, Kazuhiko, 4,942,172, Cl. 514-441.000.

Katsuki, Atsushi: *See*—
Tabata, Hiroshi; Nakao, Shizuyo; Kinoshita, Yoshihiko; and Katsuki, Atsushi, 4,941,683, Cl. 280-807.000.

Katsumata, Hideo: *See*—
Kawata, Takashi; Katsumata, Hideo; Makino, Kenya; and Chikatsu, Yoshishige, 4,942,187, Cl. 523-200.000.

Katsuyama, Mikizo: *See*—
Inagaki, Yukihiko; Masuda, Yoshikazu; Sasada, Shigeru; Katsuyama, Mikizo; and Tanaka, Hirohisa, 4,942,460, Cl. 358-75.000.

Kau, Jee I.; Pickelman, Dale M.; Schmidt, Donald L.; and Wessling, Ritchie A., to Dow Chemical Company, The. Chlorine-stable membrane compositions. 4,941,972, Cl. 210-490.000.

Kaufman, Morris: *See*—
Hare, Wilbert K.; Kaufman, Morris; and Moroziuk, William M., 4,941,585, Cl. 220-23.200.

Kawai, Makoto; Nakamura, Kazuhito; and Kageyama, Minoru, to Suzuki Jidosha Kogyo Kabushiki Kaisha. Piston assembly for internal combustion engine. 4,941,397, Cl. 92-223.000.

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Kitano, Makoto; Kawai, Sueo; Nishimura, Asao; Miura, Hideo; Yaguchi, Akihiro; Kitabayashi, Chikako; Shimizu, Ichio; Hatsuda, Toshio; Ozaki, Toshinori; Hattori, Toshio; and Sakata, Souji, 4,942,452, Cl. 357-68.000.

Kawai, Takamitsu: *See*—
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Kawai, Yoichi: *See*—
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Kawakami, Hideaki: *See*—
Konishi, Nobutake; Hosokawa, Yoshikazu; Mimura, Akio; Suzuki, Takaya; Ohwada, Jun-ichi; Kawakami, Hideaki; and Miyata, Kenji, 4,942,441, Cl. 357-23.700.

Kawamoto, Yuji: *See*—
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Kawana, Keiichi, to Kawasaki Steel Corporation. For conditioning the input to or the output from an integrated circuit. 4,942,318, Cl. 307-465.000.

Kawasaki, Masami: *See*—
Sampei, Keiichi; Kawasaki, Masami; Dei, Yosihito; Fukumoto, Katsumi; and Furukawa, Kazuo, 4,941,863, Cl. 474-33.000.

Kawasaki Steel Corporation: *See*—
Kawana, Keiichi, 4,942,318, Cl. 307-465.000.

Kawata, Takashi; Katsumata, Hideo; Makino, Kenya; and Chikatsu, Yoshishige, to Japan Synthetic Rubber Company, Ltd. Vibration-damping rubber composition. 4,942,187, Cl. 523-200.000.

Kazmerski, Lawrence L., to Midwest Research Institute. Method and apparatus for differential spectroscopic atomic-imaging using scanning tunneling microscopy. 4,942,299, Cl. 250-306.000.

Keaveney, John P.: *See*—
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Keencut Limited: *See*—
Lockwood, Robin C., 4,941,380, Cl. 83-455.000.

Keesen, Heinz-Werner; and Perdrieau, Laurent, to Deutsche Thomson-Brandt GmbH. Circuit arrangement for processing video components. 4,942,457, Cl. 358-12.000.

Kefer, Marvin S., to AIL Systems, Inc. Passive doppler differential ranging system and method. 4,942,404, Cl. 342-418.000.

Kehat, Joel: *See*—
Frank, Amos; and Kehat, Joel, 4,941,684, Cl. 281-42.000.

Kellam, Karen K.: *See*—
Do, Phuc K.; Kellam, Karen K.; Tong, Ronnie Chi-on; Willis, Ronald W.; and Wyke, Carol E., 4,942,390, Cl. 340-735.000.

Keller, George E., II: *See*—
Hsieh, Shan-Tao; and Keller, George E., II, 4,941,893, Cl. 55-16.000.

Kelley, Gary L., to Dennison Manufacturing Company. Method and apparatus for stacking apertured sheets without jamming. 4,941,654, Cl. 271-209.000.

Kellner, Urs. Process and apparatus for cold pressing a conical external thread. 4,941,341, Cl. 72-402.000.

Kellogg, David L.: *See*—
Avitan, Isaac; Allen, Ralph; Kellogg, David L.; Page, Stephen L.; and Radley, David J., 4,942,529, Cl. 364-424.010.

Kelly, Michael F.: *See*—
Grudic, Gregory Z.; Kelly, Michael F.; and Lawrence, Peter D., 4,941,739, Cl. 350-486.000.

Kelly, Richard P.: *See*—
Joyce, Thomas F.; Kelly, Richard P.; Shen, Jian-Kuo; and Raguin, Michel M., 4,942,547, Cl. 364-748.000.

Kemper, Alicia W., to Innovec, Inc. Foldable lotion applicator. 4,941,226, Cl. 15-185.000.

Kennamer, Joseph T.: *See*—
Grubb, Lloyd T., Jr.; and Kennamer, Joseph T., 4,941,813, Cl. 425-195.000.

Kennametal Inc.: *See*—
Santhanam, Anakkavur T.; and Conley, Edward V., 4,942,097, Cl. 428-552.000.
Stiffler, Stephen P., 4,941,711, Cl. 299-79.000.

Kennedy, Joseph P., to University of Akron, The. Amphiphilic networks. 4,942,204, Cl. 525-293.000.

Kennedy, Robert B.: *See*—
Allain, Reid P., 4,941,233, Cl. 17-71.000.

Kennedy, Robert P.: *See*—
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,941,795, Cl. 414-403.000.

Kennedy, William S.: *See*—
Walkow, Arnold M.; Kennedy, William S.; and Wolfe, Kenneth J., 4,941,349, Cl. 73-151.000.

Kenny, Malcolm E.: *See*—
Gupta, Balaram; Saw, Cheng K.; Kenny, Malcolm E.; and Harrington, Bruce A., 4,942,026, Cl. 423-326.000.

Keogh, Michael J., to Union Carbide Chemicals and Plastics Company, Inc. Flame retardant compositions. 4,942,069, Cl. 428-389.000.

Kerlin, Gregg W.: *See*—
Baker, William T., Jr.; Buffum, Charles M.; Jolissaint, Charles H.; and Kerlin, Gregg W., 4,942,602, Cl. 379-212.000.

Kern, David W.: *See*—
Stelts, Philip D.; Kern, David W.; and Fioravanti, Kenneth J., 4,941,646, Cl. 266-270.000.

Kerr, Donald F.: *See*—
Pope, G. Michael; and Kerr, Donald F., 4,941,415, Cl. 110-235.000.

Kerr, E. Michael; and Szyszko, Bernard R., to Nalco Chemical Company. Cleaner for high pressure cleaning of ferrous and non-ferrous material. 4,941,925, Cl. 134-3.000.

Kersten, Otto E.; Moll, Jack E.; and Balbach, George C., to ASI Technologies, Inc. Industrial hydraulic door operator. 4,941,320, Cl. 60-437.000.

Kerzner, Mark G., to Halliburton Logging Services Inc. Dipmeter processing technique. 4,942,528, Cl. 364-422.000.

Kessler, Stephen M., to Betz Laboratories, Inc. Method of stabilizing manganese in aqueous systems. 4,941,979, Cl. 210-697.000.

Keung, Felix H. N.: *See*—
Yuan, Joseph S.; MacDonald, Richard A.; and Keung, Felix H. N., 4,942,538, Cl. 364-513.000.

Keys, Dalen E.; Smothers, William K.; and Harrington, Albert F., to Du Pont de Nemours, E. I., and Company. Holographic optical elements having a reflection hologram formed in a photopolymer. 4,942,102, Cl. 430-1.000.

Keystone International Holdings Corp.: *See*—
Loos, George; and Maxwell, Horace J., 4,941,502, Cl. 137-116.000.

Kezar, Hollis S., III: *See*—
Gregory, Walter A.; and Kezar, Hollis S., III, 4,942,183, Cl. 514-376.000.

Khoe, Giok D.; and Wong, Ching K., to U.S. Phillips Corporation. Optical transmission device. 4,942,568, Cl. 370-3.000.

Khorramian, Behrooz A.: *See*—
Hardin, Tommy G.; and Khorramian, Behrooz A., 4,941,729, Cl. 350-96.230.

Kidd, John E., to Westland Aerostructures Limited. Joints and structures incorporating same. 4,941,767, Cl. 403-218.000.

Kiefer, Richard E.: *See*—
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Kieffer-Higgins, Stephen: *See*—
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Kiekert GmbH & Co. Kommanditgesellschaft: *See*—
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Kieronski, John P., to Home Courier Corporation. Apparatus for conveying material. 4,941,777, Cl. 406-13.000.

Kijima, Takao: *See*—
Tomoda, Atsuo; Itoh, Takaaki; and Kijima, Takao, 4,941,542, Cl. 180-140.000.

Kikuchi, Masayuki: *See*—
Miyagaki, Hisanori; Shimizu, Katsuhito; Tobita, Haruya; Takita, Atsushi; Kimura, Tooru; Sugano, Akira; Kikuchi, Masayuki; and Fukai, Masayuki, 4,942,514, Cl. 364-190.000.

Kikuta, Keiichi, to NEC Home Electronics Ltd. Picture information composite system. 4,942,391, Cl. 340-745.000.

Kim, Dong S.: *See*—
Koh, Moon G.; Shin, Jai M.; Kim, Dong S.; and Lee, Choon S., 4,942,243, Cl. 548-193.000.

Kimberly-Clark Corporation: *See*—
Wendt, Greg A.; Underhill, Kimberly K.; Rugowski, James S.; Kressner, Bernhardt E.; and Chiu, Kai F., 4,942,077, Cl. 428-152.000.

Kimmel, Arthur T.: *See*—
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Kimmel, Helmut; and Ruele, Hans, to Graetz, Nokia. Electron-gun system. 4,942,334, Cl. 313-414.000.

Kimoto, Tetsuo: *See*—
Abe, Yoshinori; Watanabe, Kazuo; Kimoto, Tetsuo; Hirata, Tetsuo; Kobayashi, Chiharu; and Endo, Hideki, 4,942,461, Cl. 358-75.000.
Kimura, Haruo: *See*—
Okada, Masao; Saksi, Kazuhiko; Kimura, Haruo; and Ikada, Yoshito, 4,941,870, Cl. 600-36.000.
Kimura, Hiroshi, to G-C Dental Industrial Corp. Dental chuckless handpiece. 4,941,828, Cl. 433-114.000.
Kimura, Junko: *See*—
Kimura, Takeshi, 4,941,898, Cl. 55-230.000.
Kimura, Ken: *See*—
Murayama, Masakazu; Kimura, Ken; Nakajima, Hiroyuki; Ohno, Yasuko; and Zidai, Eiki, 4,942,190, Cl. 523-400.000.
Kimura, Naofumi, to Sharp Kabushiki Kaisha. Liquid-crystal display device using twisted nematic liquid crystal molecules. 4,941,737, Cl. 350-335.000.
Kimura, Noriko: *See*—
Kimura, Takeshi, 4,941,898, Cl. 55-230.000.
Kimura, Satoru, heir: *See*—
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Kimura, Shigeru: *See*—
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Kimura, Syuzaburo, to Ikeda Bussan Co., Ltd. Shock absorbing device for vehicular seat. 4,941,648, Cl. 267-131.000.
Kimura, Takeshi, to Kimura, Takeshi; Kimura, Shigeru; Kimura, Noriko; and Kimura, Junko. Multicylinder rotary apparatus for desulfurization from exhaust gas. 4,941,898, Cl. 55-230.000.
Kimura, Tomoaki: *See*—
Sobue, Masahisa; Okada, Sensuke; Akahori, Kimihiko; Kuniya, Keiichi; Sasaki, Toshimi; Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nihei, Mitsuo, 4,941,251, Cl. 29-132.000.
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Kimura, Toshio: *See*—
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Kimura, Yasuo: *See*—
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Kinetics Technology International B.V.: *See*—
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King, Anthony O.: *See*—
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King, David L.: *See*—
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King, Glenn A.: *See*—
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King, Scott A.; Rose, Philip I.; and Maskasky, Joe E., to Eastman Kodak Company. Modified peptizer twinned grain silver halide emulsions and processes for their preparation. 4,942,120, Cl. 430-567.000.
King, William W., to Hughes Tool Company. One-piece drill bit with improved gage design. 4,941,538, Cl. 170-329.000.
Kinoshita, Yoshihiko: *See*—
Tabata, Hiroshi; Nakao, Shizuyo; Kinoshita, Yoshihiko; and Katsuki, Atsushi, 4,941,683, Cl. 280-807.000.
Kinoshita, Yukio, to Sony Corporation. Multi-chip type contact image sensor. 4,942,483, Cl. 358-484.000.
Kintz, Gregory J.; Baer, Thomas M.; and Kafka, James D., to Spectra-Physics. Single frequency solid state laser. 4,942,582, Cl. 372-18.000.
Kinzel, Helmut, to Asea Brown Boveri Aktiengesellschaft. Method for detecting a current flowing over the human body between a forward and a return conductor and a circuit configuration for carrying out the method. 4,942,313, Cl. 307-326.000.
Kirby, Alan J.: *See*—
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Kircher, Roland; and Goeltzlich, Josef, to Siemens Aktiengesellschaft. Three-dimensional, one-transistor cell arrangement for dynamic semiconductor memories comprising trench capacitor and method for manufacturing same. 4,942,554, Cl. 365-149.000.
Kirchner, Wolfgang: *See*—
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Kiritani, Masataka: *See*—
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Kirkelund, Poul; and Klausen, Jorn H., to Danfoss A/S. Oil supply system for a burner nozzle including means for preventing the nozzle from dripping. 4,941,505, Cl. 137-563.000.
Kirn, Manfred, to Robert Bosch GmbH. Clamp device for axially clamping a tool, particularly a disc. 4,941,790, Cl. 411-432.000.
Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Herbicidal substituted sulphonylaminoazoles. 4,941,912, Cl. 71-92.000.
Kishimoto, Shoji; Tomimatsu, Kiminori; and Miyake, Akio, to Takeda Chemical Industries, Ltd. Cephem compounds, their production and use. 4,942,159, Cl. 514-202.000.
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Kitajima, Ryouichi; and Otomura, Satoshi, to Ricoh Company, Ltd. Flexible electrophotographic photoconductor having a polysulfone curl prevention layer. 4,942,104, Cl. 430-56.000.
Kitajima, Tadayuki; Asakawa, Toshiyuki; Naito, Masataka; Matsuo, Kazuhiro; and Murayama, Toshiaki, to Canon Kabushiki Kaisha. Sheet sorting device. 4,941,657, Cl. 271-293.000.
Kitamura, Takashi: *See*—
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Kitano, Makoto; Kawai, Sueo; Nishimura, Asao; Miura, Hideo; Yaguchi, Akihiro; Kitabayashi, Chikako; Shimizu, Ichio; Hatsuda, Toshio; Ozaki, Toshinori; Hattori, Toshio; and Sakata, Souji, to Hitachi, Ltd. Lead frame and semiconductor device. 4,942,452, Cl. 357-68.000.
Kitterman, Lawrence R., to Seaquist Closures. Hinged dispensing closure with a tamper-evident seal. 4,941,592, Cl. 222-23.000.
Klaassen, Dirk B. M.: *See*—
Mutsaers, Cornelis A. H. A.; De Leeuw, Dagobert M.; Klaassen, Dirk B. M.; and Ronda, Cornelis R., 4,942,335, Cl. 313-468.000.
Klamer, Reuben B. Rotator game device. 4,941,665, Cl. 273-142.00H.
Klappert, Walter R.; and McPherson, Alan J., to WNM Ventures Inc. Method and apparatus for storing MIDI information in subcode packs. 4,942,551, Cl. 364-900.000.
Klas, Daniel E.: *See*—
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Klausen, Jorn H.: *See*—
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Kleemeier, Schewe & Co. KSH GmbH: *See*—
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Kleinewefers GmbH: *See*—
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Klimasek, Guenther: *See*—
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Muller, Klaus-Helmut; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,910, Cl. 71-92.000.
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Kneisel, Charles S.; Mahon, Kenneth B.; and Povio, Raymond A., to Xerox Corporation. Sheet feeding and leveling apparatus. 4,942,435, Cl. 355-311.000.
Knoller, Anton: *See*—
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Knox, Lawrence D., to North American Philips Corporation. Shadow mask with border pattern. 4,942,333, Cl. 313-402.000.
Koatsu Gas Kogyo Co., Ltd.: *See*—
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Abe, Yoshinori; Watanabe, Kazuo; Kimoto, Tetsuo; Hirata, Tetsuo; Kobayashi, Chiharu; and Endo, Hideki, 4,942,461, Cl. 358-75.000.
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Korsunsky, Iosif; Kopp, Monte L.; and Grabbe, Dimitry G., 4,941,832, Cl. 439-71.000.
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Heitmann, Uwe; Lorenzen, Heinz-Christen; Siems, Wolfgang; and Pinck, Peter, 4,941,482, Cl. 131-84.400.
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Lee, Jung D.; Yoo, Chang J.; and Lee, Moon Y., 4,942,207, Cl. 525-476.000.
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Mizuta, Susumu, 4,941,741, Cl. 351-221.000.
Koya, Keizo: *See*—
Shiba, Keisuke; and Koya, Keizo, 4,942,114, Cl. 430-434.000.
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Posdal, James R., 4,942,052, Cl. 426-512.000.
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Garwood, William E.; Krambeck, Frederick J.; Kushnerick, John D.; and Tabak, Samuel A., 4,942,021, Cl. 422-194.000.
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Kramer, Fritz. Commodity storage pile protection with a rainwater holding sponge. 4,941,888, Cl. 44-541.000.
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Krepelka, Ladislav: *See*—
Janos, Frantisek; Storek, Josef; and Krepelka, Ladislav, 4,941,274, Cl. 36-117.000.
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Wendt, Greg A.; Underhill, Kimberly K.; Rugowski, James S.; Kressner, Bernhardt E.; and Chiu, Kai F., 4,942,077, Cl. 428-152.000.
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Kristjansson, K. P.: *See*—
Johansen, Trond V.; Ruch, Ola; Naess, Ludvig; Kristjansson, K. P.; and Utengen, S. F., 4,941,511, Cl. 138-89.000.
Kronau, Paul D., to Robertshaw Controls Company. System for monitoring a level of material, device therefor and methods of making the same. 4,942,351, Cl. 318-642.000.
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Pollock, Mark A.; Stowell, William J.; and Krutak, James J., 4,942,005, Cl. 264-45.300.

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Kubota, Atsuhiko: *See*—
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Johnson, Stanley A.; Reedy, Gerald T.; and Kumar, Romesh, 4,942,297, Cl. 250-304.000.

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Kuniya, Keiichi: *See*—
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Genba, Tsuneo; Yoshinaka, Junichi; and Nakanishi, Shingo, 4,942,089, Cl. 428-364.000.
Mori, Toshiki; Suzuki, Shigeaki; and Onishi, Takashi, 4,942,262, Cl. 568-32.000.

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Sakamoto, Yujiro; Kurosaka, Toshio; Fukumoto, Hirohiko; Miyake, Toshiya; and Tokunaga, Hirohiko, 4,941,628, Cl. 244-12.200.

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Sommer, Oswin; Dorsch, Norman; Bosch, Erhard; and Kurz, Alfred, 4,942,211, Cl. 528-14.000.

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Garwood, William E.; Krambeck, Frederick J.; Kushnerick, John D.; and Tabak, Samuel A., 4,942,021, Cl. 422-194.000.

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Marscholl, Klaus; and Medebach, Thomas, 4,941,286, Cl. 49-352.000.

Kusters, Karl-Heinz. Roller for pressure treatment of a continuous web of material. 4,941,250, Cl. 29-116.100.

Kutaragi, Ken; Tanaka, Shoji; and Fujinami, Yasushi, to Sony Corporation. Recording disk having read-only recording area and writable recording area and a driving apparatus therefor. 4,942,486, Cl. 360-48.000.

Kuzumoto, Masaki: *See*—
Yasui, Koji; Tanaka, Masaaki; and Kuzumoto, Masaki, 4,942,588, Cl. 372-103.000.

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Masuzawa, Kuniyoshi; Okamura, Kyuya; Nishino, Keigo; Ohashi, Mitsuo; and Awano, Katsuya, 4,942,245, Cl. 548-329.000.

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Vann, Clifton B., III, 4,941,897, Cl. 55-158.000.

Labaig, Jean-Jacques; Fenie, Michel; and Glotin, Michel, to Atochem. Extruded conduits and method of making the same. 4,942,070, Cl. 428-36.900.

Lacey, David: *See*—
Jackson, Adam; Scrowston, Richard M.; Gray, George W.; Lacey, David; and Toyne, Kenneth J., 4,941,992, Cl. 252-299.660.

Lagadec, Roger, to Sony Corporation. Apparatus for recording a wobbling, spiral guide groove on an optical disc. 4,942,565, Cl. 369-59.000.

Laghate, Ashok S.: *See*—
Mannetje, Leonardus M. M.; and Laghate, Ashok S., 4,941,967, Cl. 208-184.000.

Lai, Shui T., to Intelligent Surgical Lasers Inc. High power diode pumped laser. 4,942,586, Cl. 372-68.000.

Laitram Corporation, The: *See*—
Lapeyre, James M., 4,941,568, Cl. 198-853.000.

Lakic, Nikola. Boot with frictional heat generator and forced air circulation. 4,941,271, Cl. 36-2.600.

Lam, Man K.; and Mathias, Milton W., to Honeywell Inc. Low cost wet-to-wet pressure sensor package. 4,942,383, Cl. 338-42.000.

Lam, Yiu-kuen T.; and Chang, Raymond S., to Merck & Co., Inc. Process for preparing synthetic virginiamycin $M_1$ analogs. 4,942,230, Cl. 540-456.000.

Lamaze, Airy-Pierre: *See*—
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Lambelet, Lawrence E., Jr.; and Frazier, Thomas A., to Ortho Pharmaceutical Corporation. Dosing cap. 4,941,598, Cl. 222-321.000.

Lamore, Patrick H. Portable tacking system. 4,941,230, Cl. 15-314.000.

Lan, Yung-Huei. Cup-holder stabilizer. 4,941,635, Cl. 248-346.100.

Lance, Jeffrey. Apparatus for testing ignition systems. 4,942,362, Cl. 324-402.000.

Lang, Hans-Jochen: *See*—
Englert, Heinrich C.; Hropot, Max; Lang, Hans-Jochen; and Greger, Rainer, 4,942,176, Cl. 514-539.000.

Lang, Manfred: *See*—
Pautz, Anton; and Lang, Manfred, 4,941,728, Cl. 350-96.210.

Langemeier, Paul W.; Phelps, Martha A.; and Morgan, Michael E., to Hi-Tek Polymers, Inc. Method for reducing the viscosity of aqueous fluid. 4,941,537, Cl. 166-308.000.

Langendorf, Brian K., to Prime Computer, Inc. Method and apparatus for indexing, accessing and updating a memory. 4,942,520, Cl. 364-200.000.

Lantz, Paul: *See*—
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Lapeyre, James M., to Laitram Corporation, The. Accurate tracking center driven open area belt. 4,941,568, Cl. 198-853.000.

La Pierre, Roger. Portable, motor-driven paint roller loader. 4,941,229, Cl. 15-257.060.

Larkin, John P.: *See*—
Casida, John E.; Palmer, Christopher J.; Larkin, John P.; and Smith, Ian H., 4,942,173, Cl. 514-452.000.

LaRose RF Systems, Inc.: *See*—
Wilkinson, Robert E.; Iseler, Kenneth A.; Smith, Rueben L.; Duerr, Lorenz K. E.; and Cargile, Harry M., 4,941,936, Cl. 156-274.800.

Larson, Edwin L. Dispensing-tube and cap holder for use in combination with an aerosol can. 4,941,594, Cl. 222-192.000.

Lasmayoux, Casimir; and Pantani, Antoine, to International Business Machines Corporation. Machine-pluggable electronic package having a mechanical interlock. 4,941,835, Cl. 439-152.000.

Lau, John R.: *See*—
Geho, W. Blair; and Lau, John R., 4,942,036, Cl. 424-425.000.

Laurenzo, Kathleen S.; and Sauer, Joe D., to Ethyl Corporation. Amine oxide process with $CO_2$ and aluminum. 4,942,260, Cl. 564-298.000.

Lauritzen, Donald R.; Ward, Michael J.; and Anderson, Scott R., to Morton Thiokol, Inc. Lightweight reaction can for passenger inflators. 4,941,678, Cl. 280-732.000.

Law, Tony Y. M., to Emmarco Industries Co., Ltd. Can opener. 4,941,262, Cl. 30-419.000.

Lawlor, Joseph A. Mount for firearm sight. 4,941,277, Cl. 42-100.000.

Lawrence, Paul J., to Litmus Concepts, Inc. Reagent composition for fecal occult blood tests. 4,942,132, Cl. 436-66.000.

Lawrence, Peter D.: *See*—
Grudic, Gregory Z.; Kelly, Michael F.; and Lawrence, Peter D., 4,941,739, Cl. 350-486.000.

Lawson, David F., to Bridgestone/Firestone, Inc. Adhesive system for bonding uncured rubber to cured polyurethane. 4,942,093, Cl. 428-423.300.

Lay, Joachim E. Magnetic and aerodynamic levitation vehicle. 4,941,406, Cl. 104-23.100.

Lazar, Michael: *See*—
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LDC Analytical Inc.: *See*—
Munk, Miner N., 4,942,018, Cl. 422-70.000.

Leahy, Ronald S.: *See*—
Smith, Patrick J.; Leahy, Ronald S.; and Bullock, Scott R., 4,942,589, Cl. 375-1.000.

Lebourg, Michel: *See*—
Petitjean, Gilbert; Lebourg, Michel; and Le Tortorec, Christian, 4,942,375, Cl. 333-81.00R.

Lectra Systemes: *See*—
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Lectron Products, Inc.: *See*—
Warakas, Thomas J.; Fraley, Keith D.; Kiefer, Richard E.; Douglas, Daniel G.; and Gilbert, Lee H., 4,942,393, Cl. 340-825.720.

Lee, Choon S.: *See*—
Koh, Moon G.; Shin, Jai M.; Kim, Dong S.; and Lee, Choon S., 4,942,243, Cl. 548-193.000.

Lee, Eva Y. - H. P.: *See*—
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Lee, Hwang-Sheng. Auxiliary device for a nursing bottle. 4,941,579, Cl. 215-11.100.

Lee, Jung D.; Yoo, Chang J.; and Lee, Moon Y., to Korea Chemical Co., Ltd. Process for the preparation of modified resin useful as a low-stress semiconductor encapsulant and composition formed therefrom. 4,942,207, Cl. 525-476.000.

Lee, Moon H.: *See*—
Imagawa, David T.; Lee, Moon H.; and Sano, Kouichi, 4,942,122, Cl. 435-5.000.

Lee, Moon Y.: *See*—
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Lee, Walter J.; and Hissem, Catherine S., to General Electric Company. Preparation of laminated structures by thermoforming. 4,942,012, Cl. 264-510.000.

Lee, Wen-Hwa; and Lee, Eva Y. - H. P., to University of California, The Regents of the. ppRB$^{110}$ the retinoblastoma susceptibility gene product. 4,942,123, Cl. 435-6.000.

Leeman Labs Inc.: *See*—
Hildebrand, Karl J.; and Urh, John, 4,941,618, Cl. 239-432.000.

Lehmann, Robert, to Ransburg-Gema AG. Method and apparatus for measuring and regulating the flow rate of powder in a powder spraying device. 4,941,778, Cl. 406-28.000.

Lehureau, Jean-Claude, to Thomson-CSF. Thin layer magnetic read/-write head. 4,942,490, Cl. 360-126.000.

Leib, Kenneth G., to Grumman Aerospace Corporation. Optical correlator system. 4,941,733, Cl. 350-162.130.

Leigh-Monstevens, Keith V., to Automotive Products plc. Hydraulic cylinder provided with a seal-less piston. 4,941,323, Cl. 60-589.000.

Leiss, John E.: *See*—
Sivan, Richard D.; Pfiester, James R.; and Leiss, John E., 4,942,137, Cl. 437-63.000.

Leitch, Clifford D.; and Steel, Francis R., deceased (by Steel, Lynne A., legal representative), to Motorola, Inc. Synchronous receiver for minimum shift keying transmission. 4,942,592, Cl. 375-90.000.

Leitis, Eriks: *See*—
Zeff, Jack D.; and Leitis, Eriks, 4,941,957, Cl. 204-157.300.

Le Pen, Yannick: *See*—
Loret, Marc; Boutquet, Daniel; and Le Pen, Yannick, 4,942,392, Cl. 340-782.000.

Lermann, Peter: *See*—
Wilsch, Herbert; Huber, Leonhard; Treiber, Helmut; Lermann, Peter; and Nagel, Erich, 4,941,620, Cl. 242-67.10R.

Lerner, Harry. Orthodontic bracket and lock pin. 4,941,825, Cl. 433-14.000.

Lestan, Elizabeth M.: *See*—
Ceisel, Stephen C.; Conrad, James F.; Lestan, Elizabeth M.; and Nelson, Allen P., 4,941,895, Cl. 55-84.000.

Le Tortorec, Christian: *See*—
Petitjean, Gilbert; Lebourg, Michel; and Le Tortorec, Christian, 4,942,375, Cl. 333-81.00R.

Le Vay, Thurston: *See*—
Hadeishi, Tetsuo; and Le Vay, Thurston, 4,941,743, Cl. 356-311.000.

Levi Strauss & Co.: *See*—
Blessing, Hubert, 4,941,333, Cl. 68-19.200.

Levin, Robert H. Compositions containing LYCD and other topically active medicinal ingredients. 4,942,031, Cl. 424-520.000.

Levine, Barry F.: *See*—
Bethea, Clyde G.; Brasen, Daniel; Levine, Barry F.; and Willens, Ronald H., 4,942,442, Cl. 357-29.000.

Lew, Hyok S. Three-in-one flowmeter. 4,941,361, Cl. 73-861.240.

Lewellin, Richard L. Insulation body. 4,941,304, Cl. 52-580.000.

LGZ Landis & Gyr Zug AG: *See*—
Renggli, Franz; and Joder, Andreas, 4,942,310, Cl. 307-271.000.

Li, Min-Ling: *See*—
Lin, Shuh-Chin; and Li, Min-Ling, 4,941,591, Cl. 221-100.000.

Li, Xin-he, to Diesel Kiki Co., Ltd. Unit fuel injector. 4,941,612, Cl. 239-88.000.

Liao, Su-Land. Automatic chalk-powder collecting device for blackboard eraser. 4,941,225, Cl. 15-98.000.

Liba Maschinenfabrik GmbH: *See*—
Denzler, Karl; Bohm, Alfred; and Wirth, Alfred, 4,941,240, Cl. 28-187.000.

Libbey-Owens-Ford Co.: *See*—
Barry, Christopher J., 4,941,302, Cl. 52-171.000.

Libby, Stuart E.; Lindskog, William J.; and Green, Gilbert, Jr., to Tansitor Electronics, Inc. Capacitor tantalum surface for use as a counterelectrode device and method. 4,942,500, Cl. 361-516.000.

Liebler, Gar D. Low metering rate liquid dispenser. 4,941,616, Cl. 239-310.000.

Lieder, Robert R.: *See*—
Heinz, Gerhard; Lieder, Robert R.; and Koch, Juergen, 4,942,216, Cl. 528-125.000.

Liff, Lawrence J. Method of making a face mask and applying the face mask to the head. 4,941,212, Cl. 2-206.000.

Liffmann, Stanley M.: *See*—
Qureshi, Humayun; Liffmann, Stanley M.; and Czaban, John D., 4,941,808, Cl. 417-415.000.

Lift-All Company, Inc.: *See*—
Klibert, Jeffrey M.; Kleinert, Stephen S.; and Bennett, Robert L., 4,941,698, Cl. 294-82.120.

Lim, Hyun S.: *See*—
Guckert, Joseph R.; and Lim, Hyun S., 4,941,947, Cl. 162-103.000.

Lin, Huoo-Shuenn; and Hsu, Juh-San. Gate array IC puller. 4,941,700, Cl. 294-99.200.

Lin, Shuh-Chin; and Li, Min-Ling, to Lin, Shuh-Chin. Office-type stationery set. 4,941,591, Cl. 221-100.000.

Lindau, Leif: *See*—
Gustavsson, Lennart; Lindau, Leif; and Johansson, Lars-Erik J, 4,941,896, Cl. 55-95.000.

Lindberg, Ulf. Orthosis. 4,941,462, Cl. 128-80.00C.

Linde, Harold G.: *See*—
Austin, Larry W.; and Linde, Harold G., 4,941,941, Cl. 156-647.000.

Lindmayer, Martin; Kneib, Rudi; Weikert, Gunther; Schneider, Wolfgang; Krugener, Rolf; and Claar, Klaus-Peter, to Daimler-Benz AG. Key case having a swing-out flat key. 4,941,569, Cl. 206-38.100.

Lindroos, Torsten: *See*—
Edelman, Kari; and Lindroos, Torsten, 4,941,943, Cl. 162-9.000.

Lindsey, Donald W.: *See*—
Brothers, Lance E.; Lindsey, Donald W.; and Terry, Dralen T., 4,941,536, Cl. 166-293.000.

Lindskog, William J.: *See*—
Libby, Stuart E.; Lindskog, William J.; and Green, Gilbert, Jr., 4,942,500, Cl. 361-516.000.

Linstroth, Thomas; Franey, Michael A.; and Idzorek, George C. Interactive synthesized speech quotation system for brokers. 4,942,616, Cl. 381-51.000.

Lipo, Thomas A.; and Murai, Yoshihiro, to Wisconsin Alumni Research Foundation. Static power conversion apparatus using a high frequency series resonant DC link. 4,942,511, Cl. 363-136.000.

Litmus Concepts, Inc.: *See*—
Lawrence, Paul J., 4,942,132, Cl. 436-66.000.

Litton U. K. Limited: *See*—
Pigott, Norman B., 4,941,407, Cl. 104-289.000.

Liu, Benjamin Y. H., to University of Minnesota, Regents of the. Cyclone personal sampler for aerosols. 4,941,899, Cl. 55-270.000.

Liu, Su-Haw. Automatic flushing device for a flush toilet. 4,941,215, Cl. 4-406.000.

Livick, Lester R. Safety featured ladder scaffolding. 4,941,547, Cl. 182-107.000.

Lockwood, Hanford N., Jr., to NEA Technologies, Inc. Pulse combustion energy system. 4,941,820, Cl. 432-58.000.

Lockwood, Robin C., to Keencut Limited. Machines for cutting cardboards and like materials. 4,941,380, Cl. 83-455.000.

Loechner, John T.: *See*—
Kruger, Kurt J.; and Loechner, John T., 4,941,570, Cl. 206-267.000.

Logan Manufacturing Company: *See*—
Beeley, Michael G.; Gittins, James D.; and Sinykin, William B., 4,941,275, Cl. 37-219.000.

Lonardi, Emile: *See*—
Cimenti, Giovanni; Lonardi, Emile; and Mailliet, Pierre, 4,941,792, Cl. 414-208.000.

Looney, Norman E.: *See*—
Pharis, Richard P.; Looney, Norman E.; and Mander, Lewis N., 4,941,908, Cl. 71-89.000.

Loos, George; and Maxwell, Horace J., to Keystone International Holdings Corp. Low pressure recirculation valve. 4,941,502, Cl. 137-116.000.

Loper, Alice E.: *See*—
Bondi, Joseph V.; and Loper, Alice E., 4,942,037, Cl. 424-448.000.

Lopez, David A.; and Toulson, Luther, to Metal Masters Foodservice Equipment Co. Dispenser with heated spout. 4,941,597, Cl. 222-146.500.

Loran, William; and Robinson, Merritt A. Apparatus for indirect dental machining. 4,941,826, Cl. 433-51.000.

Lorberth, Jorg: *See*—
Hui, Benjamin C.; and Lorberth, Jorg, 4,942,252, Cl. 556-70.000.

L'Oreal: *See*—
Aubert, Lucien; and Anthoine, Philippe, 4,942,033, Cl. 424-195.100.

Loren, Norman S., to Michael Ladney. Vehicle bumper. 4,941,701, Cl. 293-155.000.

Loren, Norman S., to Michael Ladney. Method of and apparatus for injection molding with pressurized-fluid assist. 4,942,006, Cl. 264-50.000.

Lorenz, Manfred, to Bayer Aktiengesellschaft. Preparation of diazo and azo compounds using azidoformamidium salts. 4,942,225, Cl. 534-560.000.

Lorenzen, Heinz-Christen: *See*—
Heitmann, Uwe; Lorenzen, Heinz-Christen; Siems, Wolfgang; and Pinck, Peter, 4,941,482, Cl. 131-84.400.

Loret, Marc; Boutquet, Daniel; and Le Pen, Yannick, to Sayag Electronic. Optical display device. 4,942,392, Cl. 340-782.000.

Lorica S.p.A.: *See*—
Poletto, Giorgio, 4,941,886, Cl. 8-497.000.

Lotsch, Charles F.: *See*—
Fluent, Stewart L.; Hart, Colin; McCree, Charles D.; and Lotsch, Charles F., 4,941,309, Cl. 53-544.000.

Lotts, Jury A.: *See*—
Gorodissky, Boris P.; Lotts, Jury A.; and Veretenov, Lev N., 4,941,866, Cl. 494-14.000.

Love, William J.: *See*—
Couls, Donald E.; and Love, William J., 4,941,632, Cl. 248-221.200.

Lovik, Craig J. Balloon sculpturing methods, apparatus and products. 4,941,856, Cl. 446-220.000.

Lovitt, Estel L., Jr. Adjustable frame for rail wheels on motor vehicles adaptable to ride on railroad tracks. 4,941,408, Cl. 105-72.200.

Lowery, Christopher A.: *See*—
Dody, Jospeh W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 4,942,405, Cl. 346-107.00R.

Lowitz, David A., to Philip Morris Incorporated. Apparatus and method for measuring two properties of an object using scattered electromagnetic radiation. 4,942,363, Cl. 324-631.000.

Lu, Chung H.: *See*—
Waldman, Harvey; and Lu, Chung H., 4,942,467, Cl. 358-135.000.

Lubrizol Corporation, The: *See*—
Chamberlin, William B., III; and Zalar, Frank V., 4,941,984, Cl. 252-39.000.
Jolly, Scott T., 4,941,986, Cl. 252-51.50R.

Lucas Industries: *See*—
Farr, Glyn P. R., 4,941,713, Cl. 303-116.000.
Harrison, Anthony W., 4,941,553, Cl. 188-156.000.

Lucas Industries public limited company: *See*—
Hardy, Martin P.; and Buckley, Paul, 4,941,613, Cl. 239-124.000.

Luich, Thomas M.: *See*—
Pickett, Scott K.; Luich, Thomas M.; and Swift, Arthur L., IV, 4,942,319, Cl. 307-465.000.

Lundberg, Robert D.: *See*—
Peiffer, Dennis G.; Lundberg, Robert D.; and Duvdevani, Ilan, 4,942,189, Cl. 523-339.000.

Luszczak, Myron M., to USG Interiors, Inc. Apparatus for manufacturing textured acoustical tile. 4,941,949, Cl. 162-310.000.

Luthje, Holger K. G.: *See*—
Bruns, Angelika M.; Harms, Margret; Luthje, Holger K. G.; and Matthiessen, Bernd, 4,941,942, Cl. 156-657.000.

Lykens, Gregory S. Adjustable basketball backboard apparatus. 4,941,661, Cl. 273-15.00R.

Lynch, Gregory A., to Heil-Quaker Corporation. Service thermostat. 4,942,613, Cl. 364-557.000.

Lyons, George, Jr. Roofing membrane to roof opening sealing system and hatchway employing same. 4,941,300, Cl. 52-58.000.

Lyons, Harold W., to Minnesota Mining and Manufacturing Company. Gaseous discharge tube and power supply assembly. 4,942,503, Cl. 362-74.000.

MacDonald, Richard A.: *See*—
Yuan, Joseph S.; MacDonald, Richard A.; and Keung, Felix H. N., 4,942,538, Cl. 364-513.000.

MacFarlane, Douglas R.; Philpott, Arthur K.; and Tetaz, John R., to Specialised Conductives Pty. Limited. Solid electrolyte capacitors and methods of making the same. 4,942,501, Cl. 361-523.000.

Mack, Heinz. Tooth fastening plug for a pattern. 4,941,827, Cl. 433-74.000.

Macken, John. Corner cube utilizing generally spherical surfaces. 4,941,731, Cl. 350-102.000.

MacMillan Bloedel Limited: *See*—
Redekop, Alfred W. J.; and Barnes, Derek, 4,941,521, Cl. 144-347.000.

Maeda, Akira: *See*—
Nagasaka, Yasuhiro; Shiga, Tsuneo; Shiraki, Kazuyuki; Maeda, Akira; Hashizawa, Shigemi; and Ohtaka, Kazuto, 4,941,839, Cl. 439-352.000.

Maeda, Toshio: *See*—
Isobe, Kenji; Hori, Michio; Yoshizawa, Hiroyasu; Ogawa, Kazuo; Takahashi, Hiroyuki; Noguchi, Mitsuo; and Maeda, Toshio, 4,942,099, Cl. 429-35.000.

Maekawa, Yoshiaki: *See*—
Yasuda, Takuo; Kondo, Hitoshi; Echigo, Yoshiaki; Ohsawa, Tsuneyuki; and Maekawa, Yoshiaki, 4,942,192, Cl. 524-44.000.

Maeno, Junichi, to Kabushiki Kaisha Toshiba. Congestion control method for packet switching apparatus. 4,942,569, Cl. 370-60.000.

Mag Instrument, Inc.: *See*—
Maglica, Anthony, 4,942,505, Cl. 362-187.000.

Magana, Javier: *See*—
Fleck, Rod; Poret, Mark; Mattheis, Karl-Heinz; Magana, Javier; and Meinhold, Christoph, 4,942,559, Cl. 368-113.000.

Maglica, Anthony, to Mag Instrument, Inc. Miniature flashlight. 4,942,505, Cl. 362-187.000.

Magnetic Peripherals Inc.: *See*—
Meyer, Forrest C., 4,942,609, Cl. 360-25.000.

Magris, Renzo: *See*—
Ardit, Giuseppe; Cigana, Fiorenzo; and Magris, Renzo, 4,942,346, Cl. 318-280.000.

Mahon, Kenneth B.: *See*—
Kneisel, Charles S.; Mahon, Kenneth B.; and Povio, Raymond A., 4,942,435, Cl. 355-311.000.

Maier, Elmar, to Hilti Aktiengesellschaft. Drilling device. 4,941,783, Cl. 408-204.000.

Mailliet, Pierre: *See*—
Cimenti, Giovanni; Lonardi, Emile; and Mailliet, Pierre, 4,941,792, Cl. 414-208.000.

Makajima, Masahiro: *See*—
Kashiwaba, Satoshi; and Makajima, Masahiro, 4,942,371, Cl. 331-14.000.

Maki, Kazuya: *See*—
Koyama, Hideo; Sasajima, Koji; Maki, Kazuya; Yamaguchi, Kouji; and Ishikawa, Yoshikazu, 4,941,371, Cl. 74-865.000.

Makino, Kazumasa: *See*—
Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.

Makino, Kenji: *See*—
Yoneda, Ko; Toda, Yasushi; Matsuda, Tooru; Makino, Kenji; and Nagata, Kenji, 4,942,489, Cl. 360-121.000.

Makino, Kenya: *See*—
Kawata, Takashi; Katsumata, Hideo; Makino, Kenya; and Chikatsu, Yoshishige, 4,942,187, Cl. 523-200.000.

Makino, Makoto: *See*—
Noguchi, Hiroyuki; Makino, Makoto; and Nye, David M., 4,941,564, Cl. 198-468.200.

Male, Germain J.: *See*—
Ducarroir, Michel R.; Male, Germain J.; Nadal, Marcel F.; Basse, Alain G.; Pizzini, Gerard P.; and Cazajous, Didier P., 4,942,062, Cl. 427-249.000.

Malik, Aslam A.: *See*—
Baum, Kurt; Malik, Aslam A.; and Tzeng, Donald D., 4,942,164, Cl. 528-70.000.

Mallinckrodt, Inc.: *See*—
Mertens, John, 4,942,231, Cl. 540-586.000.

Malloy, James B.: *See*—
Barrett, Charles G.; and Malloy, James B., 4,941,571, Cl. 206-378.000.

Malpage, Peter O.: *See*—
Bock, Immo E.; Nathan, Philip L.; and Malpage, Peter O., 4,941,843, Cl. 439-425.000.

MAN Gutehoffnungshutte AG: *See*—
Richter, Wolfgang-Dieter; Weeger, Engelbert; Uebel, Lutz; and Foerster, Erhard, 4,941,409, Cl. 105-157.100.

Mander, Lewis N.: *See*—
Pharis, Richard P.; Looney, Norman E.; and Mander, Lewis N., 4,941,908, Cl. 71-89.000.

Manico, Joseph A.: *See*—
Rakov, David M.; and Manico, Joseph A., 4,942,427, Cl. 355-202.000.
Rakov, David M.; and Manico, Joseph A., 4,942,428, Cl. 355-202.000.

Mannetje, Leonardus M. M.; and Laghate, Ashok S., to Kinetics Technology International B.V. Process for re-refining spent lubeoils. 4,941,967, Cl. 208-184.000.

Mannhardt, Werner G., to Colt Industries Inc. Metering valve. 4,941,447, Cl. 123-455.000.

Mantus, Ellen K.: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,942,247, Cl. 548-505.000.

Manville Corporation: *See*—
Schuster, Richard L., 4,941,624, Cl. 229-117.130.

Maranto, Jack J.; and Moulin, Norbert L., to Hughes Aircraft Company. Crimpable fiber optic terminus. 4,941,727, Cl. 350-96.200.

Marie, Gerard: *See*—
Bouchez, Alain; Cognard, Patrice; Marie, Gerard; and Schmidt, Alain, 4,941,749, Cl. 366-147.000.

Marlowe, Mickey O.; Rosenbaum, Herman S.; Rowland, Trevor C.; Patterson, Charles B., Jr.; and Davies, John H., to General Electric Company. Nuclear fuel element. 4,942,016, Cl. 376-418.000.

Marr, Helen E.: *See*—
Sanger, Gareth J.; and Marr, Helen E., 4,942,160, Cl. 514-216.000.

Marscholl, Klaus; and Medebach, Thomas, to Kuster & Co. GmbH. Tensioning device for cable window lifter. 4,941,286, Cl. 49-352.000.

Marshall, William P.: *See*—
Barch, Herbert W.; and Marshall, William P., 4,941,904, Cl. 65-1.000.

Martin Marietta Energy Systems, Inc.: *See*—
Scott, Timothy C., 4,941,959, Cl. 204-186.000.

Martin, Patricia A.: *See*—
Marzocco, Teresa; Korpusik, John; and Martin, Patricia A., 4,942,515, Cl. 364-200.000.

Martin, Steve W., to Iowa State University Research Foundation, Inc. Infrared transmitting glasses with high glass transition temperatures. 4,942,144, Cl. 501-40.000.

Martinez, Eduardo D.: *See*—
Hoel, Jeffrey H.; Martinez, Eduardo D.; and Valdes, Jacobo, 4,942,541, Cl. 364-519.000.

Martiniello, Anthony: *See—*
Guimond, Ronald; Martiniello, Anthony; Hardy, David W.; and Tellier, Raymond, 4,941,846, Cl. 439-578.000.

Marty, John L.; and Plumbo, Philip S., to Minnesota Mining and Manufacturing Company. Mixing system for use with concentrated liquids. 4,941,596, Cl. 222-144.500.

Maruyama, Atsushi: *See—*
Miyazawa, Azuma; and Maruyama, Atsushi, 4,942,417, Cl. 354-400.000.

Maruyama, Koichi: *See—*
Takahashi, Norimichi; Tanaka, Hitoshi; and Maruyama, Koichi, 4,942,414, Cl. 354-195.120.

Maruyama, Takesuke: *See—*
Hisada, Takanori; Maruyama, Takesuke; Deguchi, Masaharu; Noro, Yoshihiko; Honma, Yoshifumi; Ariki, Yoshio; and Taguchi, Shunichi, 4,941,719, Cl. 350-6.800.

Marvin Glass & Associates: *See—*
Zaruba, John V., 4,941,859, Cl. 446-476.000.

Marxer, Rochus; and Franck, Reinhard. Tensile thread holder for tooth care. 4,941,488, Cl. 132-323.000.

Marzucco, Teresa; Korpusik, John; and Martin, Patricia A., to Wang Laboratories, Inc. Serial communications controller with FIFO register for storing supplemental data and counter for counting number of words within each transferred frame. 4,942,515, Cl. 364-200.000.

Masaki, Akira: *See—*
Itoh, Hiroyuki; Yamada, Toshio; Masaki, Akira; and Kobayashi, Toru, 4,942,320, Cl. 307-546.000.

Mashiko, Harumitsu; Suzuki, Shigeru; and Seto, Takashi, to Ricoh Company, Ltd. Image reproducing device and transfer sheet used in the device. 4,942,422, Cl. 355-28.000.

Mashimo, Satoshi: *See—*
Noguchi, Toru; Takada, Toshimichi; Yonezaki, Takahiro; Yamaguchi, Yoshio; Kakiuchi, Hajime; Deki, Shigehito; Goto, Kazuo; Miyata, Hitoshi; and Mashimo, Satoshi, 4,941,961, Cl. 204-294.000.

Maska, Rudolf: *See—*
Van Buskirk, Ellor J.; and Maska, Rudolf, 4,942,193, Cl. 524-276.000.

Maskasky, Joe E.: *See—*
King, Scott A.; Rose, Philip I.; and Maskasky, Joe E., 4,942,120, Cl. 430-567.000.

Massachusetts Institute of Technology: *See—*
Pratt, George W., Jr., 4,941,474, Cl. 128-660.010.

Masters, Edwin J.; and Ebaugh, Paul L. IV infusion set with sheath. 4,941,881, Cl. 604-162.000.

Mastrantonis, Nicholas: *See—*
Tank, Klaus; Pipkin, Noel J.; and Mastrantonis, Nicholas, 4,941,892, Cl. 51-309.000.

Masuda, Kazunori: *See—*
Hieda, Teruo; Shimizu, Hiroyuki; and Masuda, Kazunori, 4,942,459, Cl. 358-41.000.

Masuda, Yoshikazu: *See—*
Inagaki, Yukihiko; Masuda, Yoshikazu; Sasada, Shigeru; Katsuyama, Mikizo; and Tanaka, Hirohisa, 4,942,460, Cl. 358-75.000.

Masuhara, Toshiaki: *See—*
Sasaki, Toshio; Aoki, Masakazu; Horiguchi, Masashi; Nakagome, Yoshinobu; Ikenaga, Shinichi; and Masuhara, Toshiaki, 4,942,556, Cl. 365-200.000.

Masui, Atusi: *See—*
Suzuki, Yasushi; Takahara, Yasuo; Masui, Atusi; Ohshima, Toshihiro; Takeuchi, Fumihiro; Sugiyama, Toshiki; and Setoguchi, Tadashi, 4,941,437, Cl. 123-41.120.

Masumura, Hidemi; Sakuma, Kyoko; and Ashida, Shinichiro, to Daiichi Seiyaku Co., Ltd. The compound, 6-(1-imidazolyl methyl)-5,6,7,8-tetrahydronaphthalene-2-carboxylic acid and salts thereof having antidiabetic activity. 4,942,171, Cl. 514-399.000.

Masuzawa, Kuniyoshi; Okamura, Kyuya; Nishino, Keigo; Ohashi, Mitsuo; and Awano, Katsuya, to Kyorin Pharmaceutical Co., Ltd. Benzimidazole Derivatives. 4,942,245, Cl. 548-329.000.

Mathias, Milton W.: *See—*
Lam, Man K.; and Mathias, Milton W., 4,942,383, Cl. 338-42.000.

Mathur, Sandip K. Dental hygiene device. 4,941,459, Cl. 128-66.000.

Matsuda, Hideaki: *See—*
Nakazawa, Hitoshi; Ohtsuka, Mari; Matsuda, Hideaki; Katori, Tatsuhiko; and Irinoda, Kazuhiko, 4,942,172, Cl. 514-441.000.

Matsuda, Tooru: *See—*
Yoneda, Ko; Toda, Yasushi; Matsuda, Tooru; Makino, Kenji; and Nagata, Kenji, 4,942,489, Cl. 360-121.000.

Matsui, Kazuma: *See—*
Fukatsu, Yoshiaki; Nomura, Etsuji; and Matsui, Kazuma, 4,941,353, Cl. 73-505.000.

Matsui, Takeshi: *See—*
Iijima, Takashi; Matsui, Takeshi; Kaneto, Shigeru; Horio, Kenji; and Kato, Toshihiko, 4,941,347, Cl. 73-116.000.

Matsui, Toshiki: *See—*
Hamamura, Atsushi; Hamada, Takaki; Nakamura, Hiroko; Imai, Tomoyuki; Matsui, Toshiki; and Horiishi, Nanao, 4,942,098, Cl. 428-555.000.

Matsumoto, Seiji: *See—*
Araki, Kazui; Kobayashi, Yoshio; Matsumoto, Seiji; and Fukushima, Hisao, 4,941,814, Cl. 425-388.000.

Matsumoto, Shun-ichiro: *See—*
Inui, Tsutomu; Matsumoto, Shun-ichiro; Ichiyasu, Rokuo; and Mizuguchi, Takeo, 4,941,920, Cl. 75-246.000.

Matsumoto, Yoshiyuki; and Kubo, Kanji, to Honda Giken Kogyo Kabushiki Kaisha. Independent wheel suspension system. 4,941,677, Cl. 280-690.000.

Matsumoto, Yukiei; and Shimamune, Takayuki, to Permelec Electrode Ltd. Durable electrodes having a plated tinor tin oxide intermediate layer for electrolysis and process for producing the same. 4,941,953, Cl. 204-541.000.

Matsumoto, Yumio; Kimura, Yasuo; and Takagi, Osamu, to Brother Kogyo Kabushiki Kaisha. Sheet heating device. 4,942,423, Cl. 355-30.000.

Matsumura, Masami; Ikeuchi, Masayuki; and Nobuto, Shinichi, to Mitsubishi Denki Kabushiki Kaisha. Ignition distributor for an internal combustion engine. 4,941,450, Cl. 123-633.000.

Matsuo, Kazuhiro: *See—*
Kitajima, Tadayuki; Asakawa, Toshiyuki; Naito, Masataka; Matsuo, Kazuhiro; and Murayama, Toshiaki, 4,941,657, Cl. 271-293.000.

Matsuoka, Hiroki, to Toyota Jidosha Kabushiki Kaisha. Air-fuel ratio feedback control system having short-circuit detection for air-fuel ratio sensor. 4,941,318, Cl. 60-274.000.

Matsuoka, Morito; and Ono, Ken'ichi, to Nippon Telegraph and Telephone Corporation. Thin film forming apparatus and ion source utilizing plasma sputtering. 4,941,915, Cl. 204-298.120.

Matsushita Electric Industrial Co., Ltd.: *See—*
Kanai, Toshio, 4,942,469, Cl. 358-153.000.
Saeki, Hiroshi; Ikeda, Junji; and Ishimaru, Hajime, 4,941,224, Cl. 15-1.50R.

Matsushita Electric Works, Ltd.: *See—*
Shimizu, Tomoyuki; Taniguchi, Yoshikazu; Higuchi, Motohiro; and Suzuki, Masashi, 4,941,608, Cl. 236-12.120.
Yamauchi, Kazumasa; and Katayama, Susumu, 4,942,384, Cl. 340-522.000.

Mattheis, Karl-Heinz: *See—*
Fleck, Rod; Poret, Mark; Mattheis, Karl-Heinz; Magana, Javier; and Meinhold, Christoph, 4,942,559, Cl. 368-113.000.

Matthews, David. Device for centering a drive shart on a hub. 4,941,805, Cl. 416-204.00R.

Matthiessen, Bernd: *See—*
Bruns, Angelika M.; Harms, Margret; Luthje, Holger K. G.; and Matthiessen, Bernd, 4,941,942, Cl. 156-657.000.

Mauchaussee, Daniel: *See—*
Audebert, Jean F.; and Mauchaussee, Daniel, 4,942,101, Cl. 429-165.000.

Maurer, Erich: *See—*
Ehmig, Gerhard; Jochum, Peter; and Maurer, Erich, 4,941,391, Cl. 89-1.140.

Maurer, John J.: *See—*
Jones, Robert S.; and Maurer, John J., 4,942,426, Cl. 355-84.000.

Maxwell, Horace J.: *See—*
Loos, George; and Maxwell, Horace J., 4,941,502, Cl. 137-116.000.

Mazda Motor Company: *See—*
Fujita, Nagahisa, 4,941,444, Cl. 123-399.000.

Mazda Motor Corporation: *See—*
Boda, Keiji; Waki, Kouichirou; Niide, Kazuo; Yokota, Hiroaki; Yanaginawa, Keizo; and Takeuchi, Hokuto, 4,942,530, Cl. 364-424.100.
Tomoda, Atsuo; Itoh, Takaaki; and Kijima, Takao, 4,941,542, Cl. 180-140.000.

McCabe, Peter J. Reciprocating double-ended piston. 4,941,396, Cl. 92-136.000.

McCartney, Clyde B. Seat structure for easy access to bathtubs. 4,941,218, Cl. 4-579.000.

McCaskey, Ricardo E. V.: *See—*
Goodlander, Theodore J.; Valdepenas, Jose M.; McCaskey, Ricardo E. V.; and Vizcaino, Gerardo, 4,942,579, Cl. 371-51.000.

McClain, Donald T., to Northern Telecom Limited. Security handset. 4,942,605, Cl. 379-424.000.

McClellan, Oliver B.; and Castorani, Samuel J. Continuous (flexible) sewage monitoring machine for sampling building effluent to measure for certain controlled substances. 4,941,360, Cl. 73-864.340.

McCluhan, Thomas K.: *See—*
Craig, Donald B.; and McCluhan, Thomas K., 4,941,914, Cl. 75-309.000.

McConnell, Harden: *See—*
Wada, Henry G.; McConnell, Harden; and Hafeman, Dean G., 4,942,127, Cl. 435-11.000.

McCree, Charles D.: *See—*
Fluent, Stewart L.; Hart, Colin; McCree, Charles D.; and Lotsch, Charles F., 4,941,309, Cl. 53-544.000.

McCusker, James J.: *See—*
Dewitz, Thomas S.; Salter, James A.; McCusker, James J.; Scott, Andrew M.; and Dirkse, Hendricus A., 4,941,779, Cl. 406-138.000.

McDonald, James C.: *See—*
Hofer, Gregory V.; and McDonald, James C., 4,942,564, Cl. 369-58.000.

McDonnell Douglas Corporation: *See—*
Palmer, Raymond J.; Bonnar, Gerard R.; and Moore, William E., 4,942,013, Cl. 264-511.000.

McGee, H. Dean; Krause, Kenneth W.; and Coldren, Bruce E., to GMF Robotics Corporation. Method and system for automatically determining the position and orientation of an object in 3-D space. 4,942,539, Cl. 364-513.000.

McGregor Company, The: *See—*
Brown, Toran S.; and McGregor, William T., 4,941,806, Cl. 417-38.000.

McGregor, William T.: *See*—
Brown, Toran S.; and McGregor, William T., 4,941,806, Cl. 417-38.000.

McIntosh, Kenneth B.; Pratt, James O.; and Stout, Donald E., to McIntosh, Kenneth B. Medication clock. 4,942,544, Cl. 364-569.000.

McLaughlin, James H. Skin cleansing-cream conditioning bar. 4,941,990, Cl. 252-121.000.

McLean, Philip W.; and English, Russell R. Device for immobilizing limb of patient. 4,941,480, Cl. 128-878.000.

McParland, Kevin W., to CTI Industries, Inc. Method of repairing heat exchanger tube ends. 4,941,512, Cl. 138-97.000.

McPherson, Alan J.: *See*—
Klappert, Walter R.; and McPherson, Alan J., 4,942,551, Cl. 364-900.000.

Meagher, Thomas F. Vehicle wheel-to-hub stud alignment and mounting tool. 4,941,253, Cl. 29-273.000.

Medebach, Thomas: *See*—
Marscholl, Klaus; and Medebach, Thomas, 4,941,286, Cl. 49-352.000.

Medicorp Holding S.A.: *See*—
Meyer, Gabriel; and Howald, Ernst, 4,941,876, Cl. 604-89.000.

Medtronic, Inc.: *See*—
Mehra, Rahul, 4,941,471, Cl. 128-419.0PG.

Meehan, Frank. Package for a liquid sample and an associated method for packaging a liquid sample. 4,941,574, Cl. 206-466.000.

Meek, Thomas T.: *See*—
Sheinberg, Haskell; Meek, Thomas T.; and Blake, Rodger D., 4,942,278, Cl. 219-10.55M.

Meffert, Alfred: *See*—
Schmid, Karl H.; Meffert, Alfred; Schenker, Gilbert; and Asbeck, Adolf, 4,942,049, Cl. 426-329.000.

Mehra, Rahul, to Medtronic, Inc. Rate stabilization pacemaker. 4,941,471, Cl. 128-419.0PG.

Meier, Jacques, to SFT AG Spontanfordertechnik. Means for manipulating and transporting loads. 4,941,798, Cl. 414-619.000.

Meighen, Terrence: *See*—
Philippson, Walter M.; Brennan, Robert J.; and Meighen, Terrence, 4,941,848, Cl. 439-607.000.

Meinert, Norbert; Huber, Werner; Dreuth, Rainer; and Franek, Henning, to Wild Leitz GmbH. Process for producing an optical fluorophosphate glass having anomalous positive partial dispersion. 4,941,907, Cl. 65-66.000.

Meinhold, Christoph: *See*—
Fleck, Rod; Poret, Mark; Mattheis, Karl-Heinz; Magana, Javier; and Meinhold, Christoph, 4,942,559, Cl. 368-113.000.

Melbourne, Thomas A.: *See*—
Morris, Joseph W.; and Melbourne, Thomas A., 4,941,398, Cl. 98-2.000.

Merck & Co., Inc.: *See*—
Bondi, Joseph V.; and Loper, Alice E., 4,942,037, Cl. 424-448.000.
DeCamp, Ann E.; Volante, Ralph P.; King, Anthony O.; and Shinkai, Ichiro, 4,942,235, Cl. 546-18.000.
Durette, Philippe L.; Ponpipom, Mitree M.; and Hagmann, William K., 4,942,154, Cl. 514-26.000.
Lam, Yiu-kuen T.; and Chang, Raymond S., 4,942,230, Cl. 540-456.000.
Saari, Walfred S., 4,942,226, Cl. 536-23.000.

Mergell, Bruno, to Emhart Industries, Inc. Stud welding apparatus. 4,942,283, Cl. 219-98.000.

Merli, Sergio: *See*—
Cassinelli, Giuseppe; Grein, Arpad; Merli, Sergio; and Rivola, Giovanni, 4,942,155, Cl. 514-34.000.

Merrill, Richard A.; Crockett, Bruce L.; and Strader, Robert C., to Allen-Bradley Company, Inc. Method and apparatus for saving and performing industrial control commands. 4,942,552, Cl. 364-900.000.

Merritt, Ervin, to Chemical Soil Stabilization Technology, Inc. Chemical soil stabilization. 4,941,924, Cl. 106-900.000.

Mertens, John, to Mallinckrodt, Inc. Method of preparing a chlorinated, brominated, radio-brominated, iodinated and/or radioiodinated aromatic or heteroaromatic compound. 4,942,231, Cl. 540-586.000.

Merval, Jean-Marc: *See*—
Imbert, Michel; and Merval, Jean-Marc, 4,942,472, Cl. 358-188.000.

Merz, Ludwig; and Niemann, Klaus, to Veba Oel Entwicklungs-Gesellschaft mbH. Process for the hydrogenative conversion of heavy oils and residual oils. 4,941,966, Cl. 208-112.000.

Messerschmitt-Boelkow-Blohm GmbH: *See*—
Baymak, Faruk; and Stueben, Helmut, 4,941,710, Cl. 297-471.000.
Huetter, Horst, 4,941,392, Cl. 89-1.510.

Messerschmitt-Bolkow-Blohm GmbH: *See*—
Dietrich, Klaus, 4,942,291, Cl. 250-203.300.

Metal Masters Foodservice Equipment Co.: *See*—
Lopez, David A.; and Toulson, Luther, 4,941,597, Cl. 222-146.500.

Metallgesellschaft Aktiengesellschaft: *See*—
Henn, Manfred; Begerow, Klaus; and Wichert, Volker, 4,941,946, Cl. 162-36.000.

Metallurgie Hoboken-Overpelt: *See*—
De Schepper, Achille J.; Haesebroek, Guy G.; and Van Peteghem, Antoine L., 4,942,023, Cl. 423-22.000.

Metsa-Serla Oy: *See*—
Edelman, Kari; and Lindroos, Torsten, 4,941,943, Cl. 162-9.000.

Metzeler GmbH: *See*—
Hartel, Volker; Heynemann, Carl; Hundt, Werner; Muller, Siegfried; and Richter, Matthias, 4,942,075, Cl. 428-109.000.

Meyer, Forrest C., to Magnetic Peripherals Inc. Electronic flying integrity tester for disk drives. 4,942,609, Cl. 360-25.000.

Meyer, Gabriel; and Howald, Ernst, to Medicorp Holding S.A. Device for conditioning liquids or liquid and solid substances. 4,941,876, Cl. 604-89.000.

Meyer, Norbert: *See*—
Freund, Wolfgang; Hamprecht, Gerhard; Wuerzer, Bruno; Westphalen, Karl-Otto; and Meyer, Norbert, 4,941,911, Cl. 71-92.000.

Meyer, Richard S.: *See*—
Winter, Daryl B.; Meyer, Richard S.; Root, Jeffrey M.; and Campbell, Michael L., 4,942,054, Cl. 426-611.000.

Meyer Zu Bexten, Jobst H.: *See*—
Heuel, Wolfgang; Meyer Zu Bexten, Jobst H.; Muller, Rainer; and Stamm, Klaus, 4,942,080, Cl. 428-212.000.

Michael Ladney: *See*—
Loren, Norman S., 4,941,701, Cl. 293-155.000.
Loren, Norman S., 4,942,006, Cl. 264-50.000.

Michalski, Steven E.: *See*—
Ellingen, David R.; Michalski, Steven E.; Mieczkowski, Daniel; and Pacetti, Larry D., 4,942,356, Cl. 324-156.000.

Micro Substrates, Inc.: *See*—
Panicker, Ramachandra M. P.; and Agarwal, Anil K., 4,942,076, Cl. 428-137.000.

Micro-Trak Systems, Inc.: *See*—
Hiniker, Thomas K.; and Tofte, Semor D., 4,942,558, Cl. 367-91.000.

Micro Vesicular Systems, Inc.: *See*—
Wallach, Donald F. H., 4,942,038, Cl. 424-450.000.

Microlife Technics, Inc.: *See*—
Vandenbergh, Peter A.; and Kunka, Blair S., 4,942,032, Cl. 424-115.000.

Micron Technology, Inc.: *See*—
Busack, Jon P.; Johnson, Gary M.; and Clem, Richard R., 4,942,576, Cl. 371-21.200.

Midwest Research Institute: *See*—
Chum, Helena L.; and Black, Stuart K., 4,942,269, Cl. 585-240.000.
Kazmerski, Lawrence L., 4,942,299, Cl. 250-306.000.

Mieczkowski, Daniel: *See*—
Ellingen, David R.; Michalski, Steven E.; Mieczkowski, Daniel; and Pacetti, Larry D., 4,942,356, Cl. 324-156.000.

Miki, Kazumi, to Sharp Kabushiki Kaisha. Ion-implantation of wiring electrodes of a semiconductor device for hillock reduction. 4,942,138, Cl. 437-182.000.

Mikolajczak, Kenneth L.: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,942,247, Cl. 548-505.000.

Milatz, Erhard. Surveillance device for the protection of an automatic delivery apparatus. 4,942,464, Cl. 358-108.000.

Miles, Donald L.: *See*—
Charles, Harry R.; Cape, Thomas W.; and Miles, Donald L., 4,941,930, Cl. 148-260.000.

Miles Inc.: *See*—
Duvall, Ronald N.; and Gold, Gerald, 4,942,039, Cl. 424-466.000.

Miles, Milton C., to FreshNes Foods Corporation. Compact food package display refrigerator. 4,941,327, Cl. 62-246.000.

Milkovic, Miran, to General Electric Company. Auto-zeroing switched-capacitance buffer amplifiers with minus-unity voltage gain. 4,942,367, Cl. 330-9.000.

Miller, David H.: *See*—
Evans, Marvin; and Miller, David H., 4,941,822, Cl. 432-112.000.

Miller, John B. Process for monitoring the effectiveness of repairs made to zones of reinforced concrete structures. 4,942,354, Cl. 324-71.200.

Miller, Ronald J., Jr. Electronic measuring device and method for obtaining an actual measurement between points shown on a scaled drawing. 4,941,267, Cl. 33-700.000.

Miller, Roy W., to Pullman Leasing Company. Hatch cover assembly. 4,941,695, Cl. 292-256.500.

Miller, Sam: *See*—
Russell, John P.; Miller, Sam; and Carroll, Terry, 4,941,479, Cl. 128-877.000.

Millerd, Donald L.; Bell, Marl J.; and Alpert, Robert S. Control system for operating a window wiper in response to water moisture. 4,942,349, Cl. 318-483.000.

Milner, Brian: *See*—
Prewer, Brian E.; and Milner, Brian, 4,942,402, Cl. 342-1.000.

Milner, Nigel E.: *See*—
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,942,117, Cl. 430-558.000.
Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, 4,942,118, Cl. 430-558.000.

Milstein, Gene. Wildflower sod mat and method of propagation. 4,941,282, Cl. 47-58.000.

Mimura, Akio: *See*—
Konishi, Nobutake; Hosokawa, Yoshikazu; Mimura, Akio; Suzuki, Takaya; Ohwada, Jun-ichi; Kawakami, Hideaki; and Miyata, Kenji, 4,942,441, Cl. 357-23.700.

Minato, Akira: *See*—
Suzuki, Mamoru; Suzuki, Katsumi; Itoh, Kazutoshi; Minato, Akira; Kambayashi, Tsuyoshi; and Hoshino, Yoshiyuki, 4,941,973, Cl. 210-175.000.

Mine, Shinji; and Shimonishi, Terumi, to NEC Corporation. Cooling structure for heat generating electronic components mounted on a substrate. 4,942,497, Cl. 361-385.000.

Ministry of International Trade and Industry: *See*—
Konishi, Shohei; Imai, Akira; Wakabayashi, Goro; and Kishioka, Hiroshi, 4,942,136, Cl. 436-512.000.

Minnesota Mining and Manufacturing Company: *See*—
John, Gunther, 4,941,932, Cl. 156-48.000.
Lyons, Harold W., 4,942,503, Cl. 362-74.000.
Marty, John L.; and Plumbo, Philip S., 4,941,596, Cl. 222-144.500.
Tengler, John N.; and Venaleck, John T., 4,941,831, Cl. 439-63.000.
Trend, John E.; and Rochford, Kent B., 4,941,996, Cl. 252-584.000.

Minolta Camera Kabushiki Kaisha: *See*—
Kaminura, Kuniaki; Sawada, Kenji; and Yamade, Yasushi, 4,942,425, Cl. 355-45.000.
Norita, Toshio; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Taniguchi, Nobuyuki, 4,942,418, Cl. 354-408.000.

Minton, Allen P.: *See*—
Chulay, Steven J., deceased; Minton, Allen P.; and Giebeler, Robert, 4,941,868, Cl. 494-37.000.

Misaizu, Iwao: *See*—
Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 4,942,212, Cl. 528-28.000.

Misch, Donald W.; Hagadorn, Irvine R., deceased; by Higgins, Thomas D., III, legal representative; Darby, William M.; and Swanson, Murray S. Semi-micro manipulator. 4,941,631, Cl. 248-178.000.

Mischer, Hans-Peter: *See*—
Granzow, Manfred; and Mischer, Hans-Peter, 4,941,641, Cl. 248-588.000.

Mitchell, Lawrence C., Sr.: *See*—
Goodell, Paul D.; and Mitchell, Lawrence C., Sr., 4,942,019, Cl. 422-169.000.

Mitsubishi Corporation: *See*—
Allen, Bobby H., 4,941,335, Cl. 70-458.000.

Mitsubishi Denki K.K.: *See*—
Nunomura, Yasuhiro, 4,942,524, Cl. 364-200.000.

Mitsubishi Denki Kabushiki Kaisha: *See*—
Isozumi, Shuzoo, 4,941,366, Cl. 74-6.000.
Kamimura, Yasuo; Ohmori, Toshiaki; Yanagi, Motonori; Fukumoto, Takaaki; and Hama, Masaharu, 4,941,489, Cl. 134-95.000.
Matsumura, Masami; Ikeuchi, Masayuki; and Nobuto, Shinichi, 4,941,450, Cl. 123-633.000.
Mori, Ryuichiro; Fukudome, Katsuyuki; Akiyama, Tatsuhiko; and Takemoto, Yoshitaka, 4,942,454, Cl. 357-70.000.
Morishita, Akira; and Isozumi, Shuzoo, 4,942,307, Cl. 290-38.00R.
Murayama, Masakazu; Kimura, Ken; Nakajima, Hiroyuki; Ohno, Yasuko; and Zidai, Eiki, 4,942,190, Cl. 523-400.000.
Ootsuki, Hideaki; Takada, Mitsuyuki; Kokogawa, Toru; and Takasago, Hayato, 4,942,140, Cl. 437-211.000.
Ooyama, Yuji; and Shimazu, Toshinari, 4,942,324, Cl. 310-216.000.
Shinohara, Toshiaki, 4,942,455, Cl. 357-70.000.
Sumi, Kazuhiko; Hashimoto, Manabu; Sakaue, Yoshikazu; Aita, Kazuo; Sasakura, Masahiro; and Ozaki, Yutaka, 4,942,618, Cl. 382-8.000.
Tamaki, Reiji; and Harada, Shigeru, 4,942,451, Cl. 357-67.000.
Tsukamoto, Katsuhiro; Inuishi, Masahide; and Shimizu, Masahiro, 4,942,448, Cl. 357-49.000.
Yasui, Koji; Tanaka, Masaaki; and Kuzumoto, Masaki, 4,942,588, Cl. 372-103.000.

Mitsubishi Rayon Co., Ltd.: *See*—
Ichimura, Kiyoshi; Ito, Kideaki; Fuse, Masaki; Suematsu, Chiaki; Suzuki, Shingo; and Takahashi, Satoshi, 4,942,292, Cl. 250-203.400.

Mitsuboshi Belting Ltd.: *See*—
Noguchi, Toru; Takada, Toshimichi; Yonezaki, Takahiro; Yamaguchi, Yoshio; Kakiuchi, Hajime; Deki, Shigehito; Goto, Kazuo; Miyata, Hitoshi; and Mashimo, Satoshi, 4,941,961, Cl. 204-294.000.

Mitsue Kinzoku Kogyo Kabushiki Kaisha: *See*—
Yamada, Shinjiro; and Nakamura, Shuji, 4,941,696, Cl. 292-340.000.

Mitsui Petrochemical Industries, Ltd.: *See*—
Motooka, Masanori; Takimoto, Kazuyuki; and Fukui, Kunisuke, 4,942,087, Cl. 428-332.000.

Mitsui Toatsu Chemicals, Inc.: *See*—
Abe, Masaru; Kawai, Yoichi; and Miyazaki, Takashi, 4,942,096, Cl. 428-476.100.
Iimuro, Shigeru; Kitamura, Takashi; and Morimoto, Yoshio, 4,942,265, Cl. 568-724.000.

Mitsuse, Motoharu: *See*—
Kobayashi, Shinji; Takada, Koichi; Watanabe, Kazuo; and Mitsuse, Motoharu, 4,942,385, Cl. 340-556.000.

Mitterreiter, Johann: *See*—
Brunner, Arthur; and Mitterreiter, Johann, 4,942,295, Cl. 250-231.130.

Miura, Hideo: *See*—
Kitano, Makoto; Kawai, Sueo; Nishimura, Asao; Miura, Hideo; Yaguchi, Akihiro; Kitabayashi, Chikako; Shimizu, Ichio; Hatsuda, Toshio; Ozaki, Toshinori; Hattori, Toshio; and Sakata, Souji, 4,942,452, Cl. 357-68.000.

Miyagaki, Hisanori; Shimizu, Katsuhito; Tobita, Haruya; Takita, Atsushi; Kimura, Tooru; Sugano, Akira; Kikuchi, Masayuki; and Fukai, Masayuki, to Hitachi, Ltd. Process monitoring and control system and method of process monitoring and control. 4,942,514, Cl. 364-190.000.

Miyajima, Akira; Shiraishi, Atushi; and Yoshida, Yasuyuki, to Citizen Watch Co., Ltd. Color liquid crystal display apparatus. 4,942,458, Cl. 358-29.000.

Miyake, Akio: *See*—
Kishimoto, Shoji; Tozuimatsu, Kiminori; and Miyake, Akio, 4,942,159, Cl. 514-202.000.

Miyake, Junichi: *See*—
Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, 4,941,372, Cl. 74-878.000.

Miyake, Toshiya: *See*—
Sakamoto, Yujiro; Kurosaka, Toshio; Fukumoto, Hirohiko; Miyake, Toshiya; and Tokunaga, Hirohiko, 4,941,628, Cl. 244-12.200.

Miyamoto, Hironobu, to NEC Corporation. Compound semiconductor field-effect transistor. 4,942,438, Cl. 357-16.000.

Miyanaka, Motoshi: *See*—
Sumi, Toyo; Miyanaka, Motoshi; Sato, Keiji; and Hayata, Yoshiki, 4,941,326, Cl. 62-180.000.

Miyano, Masateru: *See*—
Garland, Robert B.; and Miyano, Masateru, 4,942,256, Cl. 560-121.000.

Miyata, Hitoshi: *See*—
Noguchi, Toru; Takada, Toshimichi; Yonezaki, Takahiro; Yamaguchi, Yoshio; Kakiuchi, Hajime; Deki, Shigehito; Goto, Kazuo; Miyata, Hitoshi; and Mashimo, Satoshi, 4,941,961, Cl. 204-294.000.

Miyata, Kenji: *See*—
Konishi, Nobutake; Hosokawa, Yoshikazu; Mimura, Akio; Suzuki, Takaya; Ohwada, Jun-ichi; Kawakami, Hideaki; and Miyata, Kenji, 4,942,441, Cl. 357-23.700.

Miyazaki, Takashi: *See*—
Abe, Masaru; Kawai, Yoichi; and Miyazaki, Takashi, 4,942,096, Cl. 428-476.100.

Miyazawa, Azuma; and Maruyama, Atsushi, to Olympus Optical Co., Ltd. Powered zoom camera. 4,942,417, Cl. 354-400.000.

Miyazawa, Kuniaki: *See*—
Takeuchi, Shohei; Miyazawa, Kuniaki; and Ikematsu, Takenosuke, 4,941,478, Cl. 128-848.000.

Mizuguchi, Takeo: *See*—
Inui, Tsutomu; Matsumoto, Shun-ichiro; Ichiyasu, Rokuo; and Mizuguchi, Takeo, 4,941,920, Cl. 75-246.000.

Mizuki, Hideyuki: *See*—
Sago, Hiroyoshi; Mizuki, Hideyuki; Kudo, Katsuhiko; and Nakayama, Muneo, 4,941,426, Cl. 118-52.000.

Mizumura, Yutaka: *See*—
Yatsuka, Takeshi; Yamazoe, Seiji; Hirakouchi, Hiroshi; Mizumura, Yutaka; Endo, Hiroshi; and Kadowaki, Nobuo, 4,942,219, Cl. 528-272.000.

Mizuta, Susumu, to Kowa Company, Ltd. Ophthalmic disease detection apparatus. 4,941,741, Cl. 351-221.000.

Mobil Oil Corporation: *See*—
Garwood, William E.; Krambeck, Frederick J.; Kushnerick, John D.; and Tabak, Samuel A., 4,942,021, Cl. 422-194.000.
Gunesin, Binnur Z., 4,942,209, Cl. 526-173.000.
Valyocsik, Ernest W., 4,941,963, Cl. 208-46.000.

Mobrem, Matthew M. Word puzzle card game. 4,941,668, Cl. 273-248.000.

Moddel, Garret R.; and Johnson, Kirstina M., to University of Colorado Foundation, Inc. Optically addressable spatial light modulator. 4,941,735, Cl. 350-342.000.

Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., to Surgical Engineering Associates, Inc. Electrical access port assembly. 4,941,472, Cl. 128-419.0PS.

Moden, Robert D.: *See*—
Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., 4,941,472, Cl. 128-419.0PS.

Modular Computer Systems, Inc.: *See*—
Earnshaw, William E.; Howell, Jay; and Ripy, Paul B., 4,942,575, Cl. 371-10.100.

Moehle, William E.; Rogers, John J.; and Semen, John, to Ethyl Corporation. Preceramic compositions and ceramic products. 4,942,145, Cl. 501-90.000.

Moeller, Hinrich; and Wallat, Siegfried, to Henkel Kommanditgesellschaft auf Aktien. Novel sebosuppressive compounds and preparations. 4,942,174, Cl. 514-532.000.

Mohl, Lawrence M.: *See*—
Kotzin, Michael D.; Crisler, Kenneth J.; Mohl, Lawrence M.; Saltzberg, Theodore; Hong, Daehyoung; and Van den Heuvel, Anthony P., 4,942,570, Cl. 370-80.000.

Moinet, Gerard; and Imbert, Thierry, to Albert Rolland S.A. Process for obtaining α-amino nitriles and their applications to organic synthesis. 4,942,221, Cl. 558-408.000.

Moisseeff Advanced Technology, Limited: *See*—
Moisseeff, Igor, 4,941,531, Cl. 165-125.000.

Moisseeff, Igor, to Moisseeff Advanced Technology, Limited. Internal combustion engine radiator. 4,941,531, Cl. 165-125.000.

Molecular Devices Corporation: *See*—
Wada, Henry G.; McConnell, Harden; and Hafeman, Dean G., 4,942,127, Cl. 435-11.000.

Molex Incorporated: *See*—
Harwath, Frank A., 4,941,853, Cl. 439-848.000.

Moll, Jack E.: *See*—
Kersten, Otto E.; Moll, Jack E.; and Balbach, George C., 4,941,320, Cl. 60-437.000.

Moller, Anders. Examination chair for placing a patient in desired positions for E.G. radiological examination. 4,941,709, Cl. 297-325.000.

Moller, Antonius; Reimann, Herbert; Schurmann, Bernhard; and Wilts, Gerold, to Bergmann Kabelwerke AG. On-board network for motor vehicles. 4,942,571, Cl. 370-85.100.

Monnier, John R.; and Muehlbauer, Peter J., to Eastman Kodak Company. Preparation of aldehydes. 4,942,263, Cl. 568-476.000.

Monroe, Bruce M.; and Smothers, William K., to Du Pont de Nemours, E. I., and Company. Photopolymerizable compositions and elements for refractive index imaging. 4,942,112, Cl. 430-282.000.

Montaner, Pedro P.; and Turro, Victor R., to Monturas A.S. Spray pump. 4,941,595, Cl. 222-321.000.

Montano, Fausto, Jr., to Cordis Corporation. Balloon catheter. 4,941,877, Cl. 604-96.000.

Montedison S.p.A.: *See*—
Fornasier, Roberto; Tornatore, Massimo; and Chapoy, L. Lowrence, 4,942,233, Cl. 544-212.000.

Monter, Robert P.; and Smith, Ronald L., to Thermacon, Inc. Apparatus for heating a mirror or the like. 4,942,286, Cl. 219-219.000.

Montperrus, Luc: *See*—
Jutand, Francis; and Montperrus, Luc, 4,942,549, Cl. 364-786.000.

Monturas A.S.: *See*—
Montaner, Pedro P.; and Turro, Victor R., 4,941,595, Cl. 222-321.000.

Moog Ltd.: *See*—
Devitt, Francis E.; Doran, John P.; and Gaughan, Kevin J., 4,942,344, Cl. 318-254.000.

Moon, Frederick H., to Samsung Electro-Mechanics Co., Ltd. Signal feedback amplifier for a cable-TV converter. 4,942,368, Cl. 330-282.000.

Moon, Larry: *See*—
Thrasher, William H; Pavlik, Charles M.; and Moon, Larry, 4,941,452, Cl. 126-110.00R.

Moore Business Forms, Inc.: *See*—
Anderson, Michael W., 4,941,685, Cl. 282-1.00R.

Moore, David O., to Henny Penny Corporation. Ventless hood for a deep fat fryer. 4,941,400, Cl. 99-403.000.

Moore, William E.: *See*—
Palmer, Raymond J.; Bonnar, Gerard R.; and Moore, William E., 4,942,013, Cl. 264-511.000.

Moreau, Wayne M.; Chiong, Kaolin N.; Chow, Ming-Fea; and Snyder, Nancy W., to International Business Machines Corporation. Process of making diazoquinose sensitized polyamic acid based photoresist compositions having reduced dissolution rates in alkaline developers. 4,942,108, Cl. 430-169.000.

Morgan, Dale D. Razor blade rinsing device. 4,941,492, Cl. 134-182.000.

Morgan, Michael E.: *See*—
Langemeier, Paul W.; Phelps, Martha A.; and Morgan, Michael E., 4,941,537, Cl. 166-308.000.

Mori, Fumihiko: *See*—
Watanabe, Toshinori; Mori, Fumihiko; Nishiyama, Tamotsu; Furihata, Makoto; Kominami, Yasuo; and Horie, Noboru, 4,942,536, Cl. 364-490.000.

Mori, Kazunori, to Nissan Motor Co., Ltd. System for controlling the steering angle of the rear wheels of a four-wheel-steerable motor vehicle. 4,942,532, Cl. 364-424.050.

Mori, Nobufumi; Hosoi, Yuichi; and Takahashi, Kenji, to Fuji Photo Film Co., Ltd. Electron beam image recording using stimulable phosphor sheet of reduced thickness and/or with no protective layer. 4,942,300, Cl. 250-327.200.

Mori, Ryuichiro; Fukudome, Katsuyuki; Akiyama, Tatsuhiko; and Takemoto, Yoshitaka, to Mitsubishi Denki Kabushiki Kaisha. Resin sealed semiconductor device. 4,942,454, Cl. 357-70.000.

Mori, Sanae; Sasaki, Takayosi; and Ozika, Takehiro, to Daido Metal Company, Ltd. Thickness measuring apparatus. 4,941,269, Cl. 33-783.000.

Mori, Toshiki; Suzuki, Shigeaki; and Onishi, Takashi, to Kuraray Company Ltd. Process for producing vitamin A or its carboxylic acid esters. 4,942,262, Cl. 568-32.000.

Moriarty, Ann M., to Scripps Clinic and Research Foundation. SV40 expression vector containing HBxAg as an expression marker. 4,942,125, Cl. 435-7.000.

Morikawa, Asao; and Kondo, Kazuo, to NGK Spark Plug Co., Ltd. Hermetically sealed ceramic package. 4,941,582, Cl. 220-2.10R.

Morimoto, Yoshio: *See*—
Iimuro, Shigeru; Kitamura, Takashi; and Morimoto, Yoshio, 4,942,265, Cl. 568-724.000.

Morin, Louis G., to American Cyanamid. Chaff comprising metal coated fibers. 4,942,090, Cl. 428-367.000.

Morishita, Akira; and Isozumi, Shuzoo, to Mitsubishi Denki Kabushiki Kaisha. Engine starter apparatus. 4,942,307, Cl. 290-38.00R.

Morita, Tatsuo: *See*—
Nanyoshi, Yasutoshi; and Morita, Tatsuo, 4,941,442, Cl. 123-333.000.

Moroziuk, William M.: *See*—
Hare, Wilbert K.; Kaufman, Morris; and Moroziuk, William M., 4,941,585, Cl. 220-23.200.

Morris, Joseph W.; and Melbourne, Thomas A., to Bowles Fluidics Corporation. Oscillating reed and method. 4,941,398, Cl. 98-2.000.

Mort, Thomas W.; Stern, Philip A.; and Garner, Scott W., to Eastman Kodak Company. Apparatus for adding toner to an electrostatographic development station. 4,942,432, Cl. 355-260.000.

Morton, Philip G., to Dayton Extruded Plastics, Inc. Window assembly of rigid plastics material. 4,941,288, Cl. 49-504.000.

Morton Thiokol, Inc.: *See*—
Lauritzen, Donald R.; Ward, Michael J.; and Anderson, Scott R., 4,941,678, Cl. 280-732.000.

Moscrip, William M., to United States of America, Navy. Guidance and control fin. 4,941,627, Cl. 244-3.210.

Motooka, Masanori; Takimoto, Kazuyuki; and Fukui, Kunisuke, to Mitsui Petrochemical Industries, Ltd. Films of wholly aromatic polyester and processes for preparation thereof. 4,942,087, Cl. 428-332.000.

Motorola, Inc.: *See*—
Bradford, William M.; Silvers, Lloyd W.; and Dennis, Gerard A., 4,942,380, Cl. 335-301.000.
Davis, Gregory A.; and Spangler, Harold L., 4,942,358, Cl. 324-158.00R.
Davis, Walter L., 4,942,598, Cl. 379-57.000.
Deutsch, Robert W., 4,941,445, Cl. 123-414.000.
Edwards, Arthur J., 4,942,510, Cl. 363-127.000.
Kotzin, Michael D.; Crisler, Kenneth J.; Mohl, Lawrence M.; Saltzberg, Theodore; Hong, Daehyoung; and Van den Heuvel, Anthony P., 4,942,570, Cl. 370-80.000.
Leitch, Clifford D.; and Steel, Francis R., deceased, 4,942,592, Cl. 375-90.000.
Sivan, Richard D.; Pfiester, James R.; and Leisa, John E., 4,942,137, Cl. 437-63.000.
Wilkie, Brian F.; Goler, Vernon B.; Groves, Stanley E.; and Vaglica, John J., 4,942,522, Cl. 364-200.000.

Moulin, Norbert L.: *See*—
Maranto, Jack J.; and Moulin, Norbert L., 4,941,727, Cl. 350-96.200.

Moz, Rudolf: *See*—
Denz, Helmut; Moz, Rudolf; and Uttenweiler, Winfried, 4,941,446, Cl. 123-414.000.

MPS Industries, Inc.: *See*—
Euteneuer, Vaughan O., 4,941,763, Cl. 403-3.000.

MSC Technologies, Inc.: *See*—
Angwin, George T., 4,942,621, Cl. 382-59.000.

Mudge, Paul R.; Walker, James J.; and Pangrazi, Ronald, to National Starch and Chemical Investment Holding Corporation. Two-stage heat resistant binders for nonwovens. 4,942,086, Cl. 428-290.000.

Muehlbauer, Peter J.: *See*—
Monnier, John R.; and Muehlbauer, Peter J., 4,942,263, Cl. 568-476.000.

Muenstedt, Helmut: *See*—
Buchert, Hermann; Grimm, Gerhard; and Muenstedt, Helmut, 4,942,095, Cl. 428-461.000.

Muhlbauer, Ernst. Multi-component mixing capsule having an ejection device for the mixed compound, in particular for dental purposes. 4,941,751, Cl. 366-176.000.

Mukoh, Akio: *See*—
Era, Susumu; Kobayashi, Setsuo; Nakamura, Mariko; and Mukoh, Akio, 4,942,073, Cl. 428-64.000.

Muller, John: *See*—
Creamer, John J.; and Muller, John, 4,941,603, Cl. 224-148.000.

Muller, Klaus-Helmut; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, to Bayer Aktiengesellschaft. Herbicidal pyrimidine derivatives. 4,941,910, Cl. 71-92.000.

Muller, Klaus-Helmut: *See*—
Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,912, Cl. 71-92.000.

Muller, Marshall K. Hatch ventilator awning for boats. 4,941,422, Cl. 114-203.000.

Muller, Rainer: *See*—
Heuel, Wolfgang; Meyer Zu Bexten, Jobst H.; Muller, Rainer; and Stamm, Klaus, 4,942,080, Cl. 428-212.000.

Muller, Siegfried: *See*—
Hartel, Volker; Heynemann, Carl; Hundt, Werner; Muller, Siegfried; and Richter, Matthias, 4,942,075, Cl. 428-109.000.

Muneno, Yasusi: *See*—
Sasaki, Hiromi; Tanaka, Tadasi; and Muneno, Yasusi, 4,942,024, Cl. 423-65.000.

Munk, Miner N., to LDC Analytical Inc. Packed bed gradient generator for high performance liquid chromatography. 4,942,018, Cl. 422-70.000.

Murahashi, Shunichi; and Naota, Takeshi, to Osaka University. Process for preparing poly-amide from nitrile and amine with catalytic complex. 4,942,220, Cl. 528-336.000.

Murai, Yoshihiro: *See*—
Lipo, Thomas A.; and Murai, Yoshihiro, 4,942,511, Cl. 363-136.000.

Murakami, Kenjiro; and Uchiyama, Yukihiro, to Seiko Epson Corporation. Switching mechanism for a paper holding roller of a printer. 4,941,762, Cl. 400-636.100.

Muramatsu, Yukio: *See*—
Shibata, Tatsumi; Hayashi, Hideharu; Muramatsu, Yukio; and Yamamoto, Masaki, 4,942,499, Cl. 361-428.000.

Murata Manufacturing Co., Ltd.: *See*—
Arakawa, Hajime; Yamaoka, Osamu; Kubota, Kazuyuki; Kakio, Motoaki; Azuma, Yoshimasa; and Nagashima, Mitsuru, 4,942,496, Cl. 361-321.000.
Ishikawa, Youbet; Tsunoda, Kikuo; Hiratsuka, Toshiro; and Abe, Hirotsugu, 4,942,377, Cl. 333-202.000.

Murata, Masahide: *See*—
Furuhashi, Hiroyuki; Nakano, Akira; Murata, Masahide; Imai, Masafumi; and Ueno, Hiroshi, 4,942,148, Cl. 502-115.000.

Murayama, Akihiro: *See*—
Nakagawara, Chikashi; Murayama, Akihiro; and Nakamura, Shigeru, 4,942,369, Cl. 330-296.000.

Murayama, Masakazu; Kimura, Ken; Nakajima, Hiroyuki; Ohno, Yasuko; and Zidai, Eiki, to Mitsubishi Denki Kabushiki Kaisha. Thermosetting insulating resin paste. 4,942,190, Cl. 523-400.000.

Murayama, Toshiaki: *See*—
Kitajima, Tadayuki; Asakawa, Toshiyuki; Naito, Masataka; Matsuo, Kazuhiro; and Murayama, Toshiaki, 4,941,657, Cl. 271-293.000.

Murayama, Yorinobu: *See*—
Ohtani, Kenji; and Murayama, Yorinobu, 4,942,347, Cl. 318-434.000.

Murdock, Paul. Inflatable self-supporting bag. 4,941,754, Cl. 383-3.000.

Murphey, Joseph R.; and Totty, Kenneth D., to Halliburton Company. Continuously forming and transporting consolidatable resin coated particulate materials in aqueous gels. 4,942,186, Cl. 523-131.000.

Murphy, Edward J.; Ansel, Robert E.; and Krajewski, John J., to DeSoto, Inc. Method of forming a three-dimensional object by stereolithography and composition therefore. 4,942,001, Cl. 264-22.000.

Murphy, Richard, to Foss Manufacturing Co., Inc. Incompatible polymer alloys and laminates thereof. 4,942,082, Cl. 428-224.000.

Murray, Kenneth W., to Burr-Brown Ltd. Printed circuit board topography for high speed intelligent industrial controller with multiple boards located within a single slot. 4,942,550, Cl. 364-900.000.

Muscatine Gene's, Inc.: *See*—
Sander, Eugene H., 4,942,043, Cl. 426-2.000.

Musser, John H.; Bender, Reinhold H. W.; and Kreft, Anthony F., III, to American Home Products Corporation. 2-aryl substituted pyridyl-containing phenyl sulfonamido compounds as antiallergic and antiinflammatory agents. 4,942,236, Cl. 546-334.000.

Muto, Naoto, to Fuji Jukogyo Kabushiki Kaisha. Hydraulic valve-lash adjuster. 4,941,438, Cl. 123-90.460.

Mutsaers, Cornelis A. H. A.; De Leeuw, Dagobert M.; Klaassen, Dirk B. M.; and Ronda, Cornelis R., to U.S. Philips Corporation. Blue-luminescing lanthanum-gadolinium-oxybromide, luminescent screen comprising such an oxybromide and cathode ray tube provided with such a screen. 4,942,335, Cl. 313-468.000.

Nabulon, Werner, to Rieter Machine Works, Ltd. Thread treating nozzles. 4,941,242, Cl. 28-255.000.

Nadal, Marcel F.: *See*—
Ducarroir, Michel R.; Male, Germain J.; Nadal, Marcel F.; Basse, Alain G.; Pizzini, Gerard P.; and Cazajous, Didier P., 4,942,062, Cl. 427-249.000.

Naess, Ludvig: *See*—
Johansen, Trond V.; Ruch, Ola; Naess, Ludvig; Kristjansson, K. P.; and Utengen, S. F., 4,941,511, Cl. 138-89.000.

Nagai, Yoshitaka: *See*—
Yamasaki, Masahiko; Sunaga, Kiyomi; and Nagai, Yoshitaka, 4,942,131, Cl. 435-240.270.

Nagano, Masakazu; Nakagawa, Katsuya; and Nakanishi, Yoshiaki, to Nintendo Co., Ltd. Bicycle type training machine. 4,941,652, Cl. 272-73.000.

Nagano, Masato: *See*—
Kumagai, Motoo; Kato, Keiichi; Nagano, Masato; and Sakaguchi, Michiaki, 4,942,079, Cl. 428-209.000.

Nagareda, Neil N. Front pack infant carrier. 4,941,604, Cl. 224-160.000.

Nagasaka, Yasuhiro; Shiga, Tsuneo; Shiraki, Kazuyuki; Maeda, Akira; Hashizawa, Shigemi; and Ohtaka, Kazuto, to Yazaki Corporation. Double locking device for connector. 4,941,839, Cl. 439-352.000.

Nagashima, Mitsuru: *See*—
Arakawa, Hajime; Yamaoka, Osamu; Kubota, Kazuyuki; Kakio, Motoaki; Azuma, Yoshimasa; and Nagashima, Mitsuru, 4,942,496, Cl. 361-321.000.

Nagata, Kenji: *See*—
Yoneda, Ko; Toda, Yasushi; Matsuda, Tooru; Makino, Kenji; and Nagata, Kenji, 4,942,489, Cl. 360-121.000.

Nagata, Osamu: *See*—
Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.

Nagato, Nobuyuki: *See*—
Ishimura, Yoshimasa; Oe, Takami; Suyama, Yuseki; and Nagato, Nobuyuki, 4,942,261, Cl. 564-480.000.

Nagel, Erich: *See*—
Wilsch, Herbert; Huber, Leonhard; Treiber, Helmut; Lermann, Peter; and Nagel, Erich, 4,941,620, Cl. 242-67.10R.

Nagel, Karl: *See*—
Conzelmann, Gerhard; Nagel, Karl; and Fiedler, Gerhard, 4,942,308, Cl. 307-202.100.

Naito, Masataka: *See*—
Kitajima, Tadayuki; Asakawa, Toshiyuki; Naito, Masataka; Matsuo, Kazuhiro; and Murayama, Toshiaki, 4,941,657, Cl. 271-293.000.

Naka, Hirokazu: *See*—
Yamashita, Teruaki; and Naka, Hirokazu, 4,941,245, Cl. 29-78.000.

Nakada, Hiroyuki: *See*—
Ohe, Kazuhide; Sato, Kazuo; Fukuda, Shunpei; and Nakada, Hiroyuki, 4,941,818, Cl. 431-268.000.

Nakagaki, Toshio, to Bando Kagaku Kabushiki Kaisha. Grinding machine for belt materials. 4,941,294, Cl. 51-328.000.

Nakagawa, Katsuya: *See*—
Nagano, Masakazu; Nakagawa, Katsuya; and Nakanishi, Yoshiaki, 4,941,652, Cl. 272-73.000.

Nakagawara, Chikashi; Murayama, Akihiro; and Nakamura, Shigeru, to Kabushiki Kaisha Toshiba. Controlled current producing differential circuit apparatus. 4,942,369, Cl. 330-296.000.

Nakagome, Yoshinobu: *See*—
Sasaki, Toshio; Aoki, Masakazu; Horiguchi, Masashi; Nakagome, Yoshinobu; Ikenaga, Shinichi; and Masuhara, Toshiaki, 4,942,556, Cl. 365-200.000.

Nakai, Hitoshi; and Sakai, Toshio, to Brother Kogyo Kabushiki Kaisha. Image recording apparatus. 4,942,419, Cl. 355-27.000.

Nakai, Junji; and Ishikawa, Sakae, to Ricoh Company, Ltd. Fixed roller for an electrostatic image recorder. 4,942,434, Cl. 355-290.000.

Nakajima, Hiroyuki: *See*—
Murayama, Masakazu; Kimura, Ken; Nakajima, Hiroyuki; Ohno, Yasuko; and Zidai, Eiki, 4,942,190, Cl. 523-400.000.

Nakajima, Sadao, to Hakuto Chemical Co., Ltd. Inhibiting popcorn polymer formation. 4,941,926, Cl. 134-22.190.

Nakakusu, Tohru: *See*—
Umeda, Osamu; Nakakusu, Tohru; Sato, Makoto; and Shimazaki, Tatsuo, 4,941,732, Cl. 350-128.000.

Nakamura, Hiroko: *See*—
Hamamura, Atsushi; Hamada, Takaki; Nakamura, Hiroko; Imai, Tomoyuki; Matsui, Toshiki; and Horiishi, Nanao, 4,942,098, Cl. 428-555.000.

Nakamura, Katsunori: *See*—
Sotogoshi, Teruhito; Ishizaka, Yukio; and Nakamura, Katsunori, 4,941,923, Cl. 106-498.000.

Nakamura, Kazuhito: *See*—
Kawai, Makoto; Nakamura, Kazuhito; and Kageyama, Minoru, 4,941,397, Cl. 92-223.000.

Nakamura, Ken; Onoda, Toshiaki; and Gofuku, Yoshihiro, to Tokico Ltd. Vibration isolating apparatus. 4,941,640, Cl. 248-562.000.

Nakamura, Kouji, to Hitachi, Ltd. Buffer control method and apparatus. 4,942,578, Cl. 371-36.000.

Nakamura, Mariko: *See*—
Era, Susumu; Kobayashi, Setsuo; Nakamura, Mariko; and Mukoh, Akio, 4,942,073, Cl. 428-64.000.

Nakamura, Masahiko, to Hosiden Electronics Co., Ltd. Electrical connector. 4,941,837, Cl. 439-341.000.

Nakamura, Shigeo, to Fanuc Ltd. Switching regulator. 4,942,508, Cl. 363-19.000.

Nakamura, Shigeru: *See*—
Nakagawara, Chikashi; Murayama, Akihiro; and Nakamura, Shigeru, 4,942,369, Cl. 330-296.000.

Nakamura, Shinya, to Tokyo Electric Co., Ltd. Image pickup printing system using non-NTSC signals. 4,942,477, Cl. 358-401.000.

Nakamura, Shuji: *See*—
Yamada, Shinjiro; and Nakamura, Shuji, 4,941,696, Cl. 292-340.000.

Nakamura, Takaharu: *See*—
Sugimoto, Hachiro; Nakamura, Takaharu; Tsuchiya, Yutaka; Sugumi, Hiroyuki; Higurashi, Kunizou; Karibe, Norio; Yamanishi, Yoshiharu; Ogura, Hiroo; Araki, Shin; Kubota, Atsuhiko; Ohtake, Michiko; and Tamatsu, Kiyomi, 4,942,169, Cl. 514-318.000.

Nakamura, Yukinobu: *See*—
Umehara, Shinji; and Nakamura, Yukinobu, 4,942,485, Cl. 360-46.000.

Nakanata, Fumitoshi: *See*—
Ozawa, Paul; Brooks, Mark; and Nakanata, Fumitoshi, 4,942,373, Cl. 333-161.000.

Nakanishi, Shingo: *See*—
Genba, Tsuneo; Yoshinaka, Junichi; and Nakanishi, Shingo, 4,942,089, Cl. 428-364.000.

Nakanishi, Yoshiaki: *See*—
Nagano, Masakazu; Nakagawa, Katsuya; and Nakanishi, Yoshiaki, 4,941,652, Cl. 272-73.000.

Nakaniwa, Shinpei; and Tomisawa, Naoki, to Japan Electronic Control Systems Co., Ltd. Fuel supply control system for internal combustion engine with improved response characteristics to variation of induction air pressure. 4,941,448, Cl. 123-488.000.

Nakano, Akira: *See*—
Furuhashi, Hiroyuki; Nakano, Akira; Murata, Masahide; Imai, Masafumi; and Ueno, Hiroshi, 4,942,148, Cl. 502-115.000.

Nakao, Shizuyo: *See*—
Tabata, Hiroshi; Nakao, Shizuyo; Kinoshita, Yoshihiko; and Katsuki, Atsushi, 4,941,683, Cl. 280-807.000.

Nakashima, Terumi; and Tanaka, Takeshi, to Nippon Acchakutanshi Seizo Kabushiki Kaisha. Board-in type contact-connectors. 4,941,842, Cl. 439-399.000.

Nakata, Takashi: *See*—
Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; Nakata, Takashi; and Horaguchi, Yoichi, 4,942,420, Cl. 355-27.000.
Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.

Nakayama, Muneo: *See*—
Sago, Hiroyoshi; Mizuki, Hideyuki; Kudo, Katsuhiko; and Nakayama, Muneo, 4,941,426, Cl. 118-52.000.

Nakayama, Rinichi: *See*—
Yoshida, Yasunori; Nakayama, Rinichi; and Iwama, Satoshi, 4,942,197, Cl. 524-496.000.

Nakayama, Takashi, to NEC Corporation. Coprocessor having a slave processor capable of checking address mapping. 4,942,519, Cl. 364-200.000.

Nakayama, Takayuki: *See*—
Sakagawa, Tetsuo; Nakayama, Takayuki; Kunihiro, Hisanobu, deceased; and Kunihiro, Masako, legal representative, 4,941,887, Cl. 8-642.000.

Nakazawa, Hitoshi; Ohtsuka, Mari; Matsuda, Hideaki; Katori, Tatsuhiko; and Irinoda, Kazuhiko, to SS Pharmaceutical Co., Ltd. Method of curing hepatic disease. 4,942,172, Cl. 514-441.000.

Nalco Chemical Company: *See*—
Kerr, E. Michael; and Szyszko, Bernard R., 4,941,925, Cl. 134-3.000.

Nalesnik, Theodore E.: *See*—
Benfaremo, Nicholas; Kapuscinski, Maria M.; and Nalesnik, Theodore E., 4,941,985, Cl. 252-51.50R.

Nanyoshi, Yasutoshi; and Morita, Tatsuo, to Nissan Motor Co., Ltd. Apparatus for controlling fuel delivery to engine. 4,941,442, Cl. 123-333.000.

Naota, Takeshi: *See*—
Murahashi, Shunichi; and Naota, Takeshi, 4,942,220, Cl. 528-336.000.

Narasimham, Pundi L., to American Telephone and Telegraph Company, AT&T Technologies, Inc. Methods of soot overcladding an optical preform. 4,941,905, Cl. 65-3.120.

Narayanan, Venkatachala: *See*—
Haugwitz, Rudiger D.; Zalkow, Leon; Glinski, Jan; Suffness, Mathew; Deutsch, Howard M.; and Narayanan, Venkatachala, 4,942,184, Cl. 514-449.000.

Narberes, Gary A. Microwave popcorn service bowl. 4,942,277, Cl. 219-10.55E.

Narushima, Masaki: *See*—
Koike, Hisashi; Takao, Itaru; Narushima, Masaki; and Takekoshi, Kiyoshi, 4,941,800, Cl. 414-752.000.

Nasu, Yasunobu; Ogishima, Taichi; Dei, Akira; Uchida, Haruhiko; Inami, Mitsuru; Furuhashi, Tatsuo; Hino, Yasuhiko; and Sugimura, Hideo, to Nippon Kayaku Kabushiki Kaisha. Process for preserving food and deoxygenating composition. 4,942,048, Cl. 426-271.000.

Nathan, Philip L.: *See*—
Bock, Immo E.; Nathan, Philip L.; and Malpage, Peter O., 4,941,843, Cl. 439-425.000.

National Research Development Corporation: *See*—
Garland, Robert B.; and Miyano, Masateru, 4,942,256, Cl. 560-121.000.

National Semiconductor Corp.: *See*—
Pickett, Scott K.; Luich, Thomas M.; and Swift, Arthur L., IV, 4,942,319, Cl. 307-465.000.

National Starch and Chemical Investment Holding Corporation: *See*—
Flanagan, Thomas P.; and Puletti, Paul, 4,942,195, Cl. 524-294.000.
Mudge, Paul R.; Walker, James J.; and Pangrazi, Ronald, 4,942,086, Cl. 428-290.000.

Natsume, Yoshihisa, to Yazaki Corporation. Structure for fastening a resin member with a threaded bolt. 4,941,769, Cl. 403-408.100.

Navistar International Transportation Corp.: *See*—
Tausk, Edward F., 4,941,268, Cl. 33-729.000.

Nazarathy, Moshe; Zorabedian, Paul; Richard, William; and Ranganath, Tirumala R., to Hewlett-Packard Company. Misalignment-tolerant, grating-tuned external-cavity laser. 4,942,583, Cl. 372-20.000.

NEA Technologies, Inc.: *See*—
Lockwood, Hanford N., Jr., 4,941,820, Cl. 432-58.000.

Nease, Greg A.; and Cripps, Peter K., to Agilis Corporation. Multiple phase PSK demodulator. 4,942,591, Cl. 375-84.000.

NEC Corporation: *See*—
Hinami, Junji, 4,942,389, Cl. 340-703.000.
Iwashita, Shinichi, 4,942,450, Cl. 357-54.000.
Kashiwaba, Satoshi; and Makajima, Masahiro, 4,942,371, Cl. 331-14.000.
Koga, Toshio; Ohki, Junichi; Ohta, Mutsumi; and Kunihiro, Hideto, 4,942,476, Cl. 358-335.000.
Mine, Shinji; and Shimonishi, Terumi, 4,942,497, Cl. 361-385.000.
Miyamoto, Hironobu, 4,942,438, Cl. 357-16.000.
Nakayama, Takashi, 4,942,519, Cl. 364-200.000.
Nishitani, Takao; and Tamitani, Ichiro, 4,942,470, Cl. 358-160.000.
Ohta, Mutsumi, 4,942,465, Cl. 358-133.000.
Ozaki, Hideharu, 4,942,577, Cl. 371-22.300.
Uematsu, Ryosuke; Shindo, Kazunori; Kariya, Yoshinobu; and Oikawa, Shinro, 4,942,475, Cl. 355-256.000.
Yokoyama, Hiroshi, 4,942,403, Cl. 342-372.000.

NEC Home Electronics Ltd.: *See*—
Kikuta, Keiichi, 4,942,391, Cl. 340-745.000.
Koga, Toshio; Ohki, Junichi; Ohta, Mutsumi; and Kunihiro, Hideto, 4,942,476, Cl. 358-335.000.

Negas, Taki; and Domingues, Louis P., to Alpha Industries. Dense ceramic alloys and process of making same. 4,942,146, Cl. 501-134.000.

Nelson, Allen P.: *See*—
Ceisel, Stephen C.; Conrad, James F.; Lestan, Elizabeth M.; and Nelson, Allen P., 4,941,895, Cl. 55-84.000.

Nelson, Gary W. Cantilevered drawer slide arrangement. 4,942,329, Cl. 312-341.100.

Neri, Carlo: *See*—
Borgarello, Enrico; Carlini, Filippo M.; Neri, Carlo; and Platone, Edoardo, 4,942,179, Cl. 514-659.000.

Nevill, Gale E., Jr., to University of Florida. High temperature sensor for induced vibration dynamic touch sensor system. 4,942,620, Cl. 382-58.000.

Newman, Paul R.; and Cunningham, Patricia H., to Rockwell International Corporation. Electrically heated structural composite and method of its manufacture. 4,942,078, Cl. 428-192.000.

NGK Spark Plug Co., Ltd.: *See*—
Morikawa, Asao; and Kondo, Kazuo, 4,941,582, Cl. 220-2.10R.
Suzuki, Osamu; and Ishida, Noboru, 4,941,760, Cl. 384-537.000.

Niemann, Klaus: *See*—
Merz, Ludwig; and Niemann, Klaus, 4,941,966, Cl. 208-112.000.

Nigam, Anil K., to Fujitsu America, Inc. Floppy disk drive with closed loop servoed high density read/write gap, and with low density read/write gap for the write updating of standard open loop formatted medium. 4,942,484, Cl. 360-46.000.

Nihei, Mitsuo: *See*—
Sobue, Masahisa; Okada, Sensuke; Akahori, Kimihiko; Kuniya, Keiichi; Sasaki, Toshimi; Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nihei, Mitsuo, 4,941,251, Cl. 29-132.000.

Nihon Cement Co., Ltd.: *See*—
Yamabe, Keiji; and Yoshinaga, Masao, 4,941,561, Cl. 198-365.000.

Nihon Shinku Gijutsu Kabushiki Kaisha: *See*—
Tsukakoshi, Osamu, 4,942,342, Cl. 315-410.000.

Nihon Sinku Gijutsu Kabusiki Kaisha: *See*—
Watanabe, Kazuhiro; Saito, Kazuya; Yuchi, Yoshiyuki; and Inagawa, Konosuke, 4,941,430, Cl. 118-723.000.

Niide, Kazuo: *See*—
Boda, Keiji; Waki, Kouichirou; Niide, Kazuo; Yokota, Hiroaki; Yanagisawa, Keizo; and Takeuchi, Hokuto, 4,942,530, Cl. 364-424.100.

Niimura, Satoru: *See*—
Yokokura, Takashi; Hori, Nobuo; Shimozono, Hiroaki; and Niimura, Satoru, 4,941,744, Cl. 356-358.000.

Nikon Corporation: *See*—
Saegusa, Takashi; Goto, Tetsuro; and Yasukawa, Seiichi, 4,942,413, Cl. 354-173.110.
Takagi, Makoto; Fujii, Norio; and Fujimori, Yoshihiko, 4,942,619, Cl. 382-47.000.

Nikravech, Mehrdad: *See*—
Amouroux, Jacques; and Nikravech, Mehrdad, 4,941,965, Cl. 208-108.000.

Niksic, Mark R.: *See*—
Pelsue, Bradley A.; and Niksic, Mark R., 4,941,499, Cl. 135-104.000.

Nilsen, Ole K. Electronic air register controller. 4,942,348, Cl. 318-468.000.

Nilsson, Hans-Ove, to AB Volvo. Device for regulation of the flow of an operative medium. 4,941,526, Cl. 165-32.000.

Nintendo Co., Ltd.: *See*—
Nagano, Masakazu; Nakagawa, Katsuya; and Nakanishi, Yoshiaki, 4,941,652, Cl. 272-73.000.

Nippon Acchakutanshi Seizo Kabushiki Kaisha: *See*—
Nakashima, Terumi; and Tanaka, Takeshi, 4,941,842, Cl. 439-399.000.

Nippon Kayaku Kabushiki Kaisha: *See*—
Nasu, Yasunobu; Ogishima, Taichi; Dei, Akira; Uchida, Haruhiko; Inami, Mitsuru; Furuhashi, Tatsuo; Hino, Yasuhiko; and Sugimura, Hideo, 4,942,048, Cl. 426-271.000.
Sotogoshi, Teruhito; Ishizaka, Yukio; and Nakamura, Katsunori, 4,941,923, Cl. 106-498.000.

Nippon Oil & Fats Co. Ltd.: *See*—
Kumagai, Motoo; Kato, Keiichi; Nagano, Masato; and Sakaguchi, Michiaki, 4,942,079, Cl. 428-209.000.

Nippon Seiko Kabushiki Kaisha: *See*—
Osawa, Nobuyuki, 4,941,758, Cl. 384-40.000.
Sasaki, Takanobu, 4,941,681, Cl. 280-804.000.
Yamamoto, Kazuo, 4,941,682, Cl. 280-804.000.

Nippon Steel Corporation: *See*—
Yatsuka, Takeshi; Yamazoe, Seiji; Hirakouchi, Hiroshi; Mizumura, Yutaka; Endo, Hiroshi; and Kadowaki, Nobuo, 4,942,219, Cl. 528-272.000.

Nippon Telegraph and Telephone Corporation: *See*—
Matsuoka, Morito; and Ono, Ken'ichi, 4,941,915, Cl. 204-298.120.

Nippondenso Co., Ltd.: *See*—
Fukatsu, Yoshiaki; Nomura, Etsuji; and Matsui, Kazuma, 4,941,353, Cl. 73-505.000.
Suzuki, Yasushi; Takahara, Yasuo; Masui, Atusi; Ohshima, Toshihiro; Takeuchi, Fumihiro; Sugiyama, Toshiki; and Setoguchi, Tadashi, 4,941,437, Cl. 123-41.120.

Nishida, Takao: *See*—
Yamaguchi, Fumihiro; Sayama, Yoshiaki; and Nishida, Takao, 4,941,443, Cl. 123-376.000.

Nishigaki, Satoshi: *See*—
Yoshinouchi, Atsushi; Itoh, Masataka; Tsuchimoto, Shuhei; Tarui, Keiji; and Nishigaki, Satoshi, 4,942,481, Cl. 358-471.000.

Nishijima, Jun-ichi; and Fukui, Minoru, to Asahi Kasei Kogyo Kabushiki Kaisha. Moisture and dew-detection sensor. 4,942,364, Cl. 324-696.000.

Nishimukai, Tadahiko: *See*—
Hanawa, Makoto; Hasegawa, Atsushi; and Nishimukai, Tadahiko, 4,942,521, Cl. 364-200.000.

Nishimura, Asao: *See*—
Kitano, Makoto; Kawai, Sueo; Nishimura, Asao; Miura, Hideo; Yaguchi, Akihiro; Kitabayashi, Chikako; Shimizu, Ichio; Hatsuda, Toshio; Ozaki, Toshinori; Hattori, Toshio; and Sakata, Souji, 4,942,452, Cl. 357-68.000.

Nishino, Keigo: *See*—
Masuzawa, Kuniyoshi; Okamura, Kyuya; Nishino, Keigo; Ohashi, Mitsuo; and Awano, Katsuya, 4,942,245, Cl. 548-329.000.

Nishitani, Takao; and Tamitani, Ichiro, to NEC Corporation. Real time processor for video signals. 4,942,470, Cl. 358-160.000.

Nishiyama, Tamotsu: *See*—
Watanabe, Toshinori; Mori, Fumihiko; Nishiyama, Tamotsu; Furihata, Makoto; Kominami, Yasuo; and Horie, Noboru, 4,942,536, Cl. 364-490.000.

Nissan Chemical Industries Ltd.: *See*—
Tanaka, Norio; Kakuta, Takuya; Oya, Eiichi; and Baba, Masatoshi, 4,942,246, Cl. 548-367.000.

Nissan Design International, Inc.: *See*—
Hirshberg, Gerald P., 4,941,263, Cl. 33-264.000.

Nissan Motor Co., Ltd.: *See*—
Ishii, Yoshihiko, 4,941,370, Cl. 475-128.000.
Ito, Hideo; and Yokote, Masatsugu, 4,941,541, Cl. 180-140.000.
Mori, Kazunori, 4,942,532, Cl. 364-424.050.
Nanyoshi, Yasutoshi; and Morita, Tatsuo, 4,941,442, Cl. 123-333.000.
Yokoyama, Masaharu; Ogino, Koichi; and Suzuki, Hidetaka, 4,942,534, Cl. 364-468.000.

Nist, Thomas R.; and Garnett, Edward V., to Figgie International Inc. Aerial ladder rotation limiter. 4,941,546, Cl. 182-17.000.

Nittsu Shoji Kabushiki Kaisha: *See*—
Hara, Yoshimasa; Ohkura, Seisaku; Iijima, Fumio; Tamura, Isamu; Fukai, Tetsuro; Tagiri, Sumiho; and Takagi, Norimasa, 4,941,794, Cl. 414-341.000.

Niv, Israel: *See*—
Halavee, Uriel; Niv, Israel; and Schwarzkopf, Tzila, 4,941,980, Cl. 250-310.000.

NKK Corporation: *See*—
Tachibana, Yakudo; Tate, Kazuhiko; Suzuki, Toshifumi; and Chiba, Kouji, 4,942,257, Cl. 562-481.000.

Nobuto, Shinichi: *See*—
Matsumura, Masami; Ikeuchi, Masayuki; and Nobuto, Shinichi, 4,941,450, Cl. 123-633.000.

Noguchi, Hiroyuki; Makino, Makoto; and Nye, David M., to Honda Giken Kogyo Kabushiki Kaisha. Method of and apparatus for transferring motorcycle. 4,941,564, Cl. 198-468.200.

Noguchi, Mitsuo: *See*—
Isobe, Kenji; Hori, Michio; Yoshizawa, Hiroyasu; Ogawa, Kazuo; Takahashi, Hiroyuki; Noguchi, Mitsuo; and Maeda, Toshio, 4,942,099, Cl. 429-35.000.

Noguchi, Noboru: *See*—
Nomura, Yoshihisa; and Noguchi, Noboru, 4,941,322, Cl. 60-547.100.

Noguchi, Takaharu; and Arai, Takao, to Hitachi, Ltd. Apparatus for recording/reproducing a digital signal at variable speeds. 4,942,487, Cl. 360-77.130.

Noguchi, Toru; Takada, Toshimichi; Yonezaki, Takahiro; Yamaguchi, Yoshio; Kakiuchi, Hajime; Deki, Shigehito; Goto, Kazuo; Miyata, Hitoshi; and Mashimo, Satoshi, to Mitsuboshi Belting Ltd. Flexible elastomer electrode. 4,941,961, Cl. 204-294.000.

Nohara, Kazunori: *See*—
Hosoya, Nobukazu; Nohara, Kazunori; Ikeguchi, Yasuyuki; Sasaki, Tooru; and Hirao, Yoshichika, 4,942,314, Cl. 307-352.000.

Noisier, Guy, to Solex. Fuel supply device with cooled flow chamber. 4,941,999, Cl. 261-130.000.

Nomura, Etsuji: *See*—
Fukatsu, Yoshiaki; Nomura, Etsuji; and Matsui, Kazuma, 4,941,353, Cl. 73-505.000.

Nomura, Hironori; Shimakawa, Taiji; Shinohara, Junji; Kobayashi, Shigetoyo; and Yamamoto, Hiroki, to Uni-Charm Corporation. Apparatus for applying an elastic band onto a moving web. 4,941,939, Cl. 156-495.000.

Nomura, Yoshihisa; and Noguchi, Noboru, to Toyota Jidosha Kabushiki Kaisha. Tandem master cylinder with valved hydraulic power booster fluid passage in piston. 4,941,322, Cl. 60-547.100.

Norita, Toshio; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Taniguchi, Nobuyuki, to Minolta Camera Kabushiki Kaisha. Focus condition detecting device. 4,942,418, Cl. 354-408.000.

Normandin, Richard J. F., to Canadian Patents & Development Limited. All-optical planar modulator structure with channel waveguides. 4,941,725, Cl. 350-96.130.

Normandin, Sharon E.; Bowne, Arlyce T.; Milner, Nigel E.; and Clarke, David, to Eastman Kodak Company. Photographic silver halide materials and process comprising a pyrazoloazole coupler. 4,942,117, Cl. 430-558.000.

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Noro, Yoshihiko: *See*—
Hisada, Takanori; Maruyama, Takesuke; Deguchi, Masaharu; Noro, Yoshihiko; Honma, Yoshifumi; Ariki, Yoshio; and Taguchi, Shunichi, 4,941,719, Cl. 350-6.800.

North American Dynamics: *See*—
Dodd, Richard E.; and Baldwin, William C., 4,941,393, Cl. 89-35.010.

North American Philips Corporation: *See*—
Brennesholtz, Matthew S.; and Patt, Paul J., 4,942,063, Cl. 427-256.000.
Knox, Lawrence D., 4,942,333, Cl. 313-402.000.

Northern Telecom Limited: *See*—
McClain, Donald T., 4,942,605, Cl. 379-424.000.

Noschese, Rocco; and Lazar, Michael, to Burndy Corporation. Controlled impedance plug and receptacle. 4,941,833, Cl. 439-92.000.

Nothacker, Siegfried: *See*—
Baumert, Heinz; Bruhnke, Ulrich; Greiner, Ferdinand; and Nothacker, Siegfried, 4,941,704, Cl. 296-97.110.

Noujaim, Sharbel E.: *See*—
Hartley, Richard I.; Corbett, Peter F.; Yassa, Fathy F.; and Noujaim, Sharbel E., 4,942,396, Cl. 341-101.000.

Nova Technologies, Inc.: *See*—
DiMatteo, Paul; Chubb, Charles F.; and Segnini, Robert, 4,941,220, Cl. 5-81.00R.

Novy, Paul M., to PPG Industries, Inc. Tertiary-alkyl esters of 1H-benzotriazole-1-carboxylic acids. 4,942,248, Cl. 548-533.000.

Nowak, Thomas E.; Smith, Edward J.; and Vassiliou, Eustathios, to Vassiliou, E. Method of fabricating wall fasteners. 4,941,340, Cl. 72-379.200.

NTN-Rulon Industries, Co., Ltd.: *See*—
Kunimoto, Akihiro; and Umemoto, Noboru, 4,942,007, Cl. 264-122.000.

NTN-Rulon Industries, Ltd.: *See*—
Takabayashi, Seiichirou; and Egami, Masaki, 4,942,092, Cl. 428-401.000.

Nuckols, James H.: *See*—
Kaiser, Roger A.; Nuckols, James H.; Emerson, Theodore F.; and Brasher, Gary L., 4,942,606, Cl. 380-4.000.

Nuding, Douglas J. Energy efficient electronic control system for air-conditioning and heat pump systems. 4,941,325, Cl. 62-158.000.

Nunomura, Yasuhiro, to Mitsubishi Denki K.K. Software trap system which saves previous content of software trap handling pointer in a stack upon execution of a trap. 4,942,524, Cl. 364-200.000.

N.V. Machinefabriek Terlet: *See*—
Boer, Jort, 4,941,529, Cl. 165-94.000.

Nye, David M.: *See*—
Noguchi, Hiroyuki; Makino, Makoto; and Nye, David M., 4,941,564, Cl. 198-468.200.

Nynex Corporation: *See*—
Shu, Joseph S., 4,942,480, Cl. 358-455.000.

Obuvnicky prumysl SVIT statni podnik: *See*—
Janos, Frantisek; Storek, Josef; and Krepelka, Ladislav, 4,941,274, Cl. 36-117.000.

O'Callaghan, Wilfred B.: *See*—
Hunter, John A.; Scamans, Geoffrey M.; and O'Callaghan, Wilfred B., 4,942,100, Cl. 429-50.000.

Occidential Chemical Corporation: *See*—
Roark, Roger W.; Cairns, Glenn R.; and Rowe, Edward A., Jr., 4,942,267, Cl. 570-109.000.

Ocean Tech Marine, Inc.: *See*—
Van Tassel, Gary W., 4,941,423, Cl. 114-289.000.

Odawara, Kunimitsu, to Odaware Industry Co., Ltd. Apparatus for treating tail yarn in textile spindle assembly. 4,941,314, Cl. 57-299.000.

Odaware Industry Co., Ltd.: *See*—
Odawara, Kunimitsu, 4,941,314, Cl. 57-299.000.

Oe, Takami: *See*—
Ishimura, Yoshimasa; Oe, Takami; Suyama, Yuseki; and Nagato, Nobuyuki, 4,942,261, Cl. 564-480.000.

Ogawa, Hiroo; and Kawai, Takamitsu, to Brother Kogyo Kabushiki Kaisha. Printing device capable of low-density printing and high-density printing. 4,941,761, Cl. 400-124.000.

Ogawa, Kazuo: *See*—
Isobe, Kenji; Hori, Michio; Yoshizawa, Hiroyasu; Ogawa, Kazuo; Takahashi, Hiroyuki; Noguchi, Mitsuo; and Maeda, Toshio, 4,942,099, Cl. 429-35.000.

Ogawa, Souichi; Sugioka, Takao; and Inoue, Masaru, to Osaka Prefecture; and Koatsu Gas Kogyo Co., Ltd. Superconductor for magnetic field shield. 4,942,379, Cl. 335-301.000.

Ogino, Koichi: *See*—
Yokoyama, Masaharu; Ogino, Koichi; and Suzuki, Hidetaka, 4,942,534, Cl. 364-468.000.

Ogishima, Taichi: *See*—
Nasu, Yasunobu; Ogishima, Taichi; Dei, Akira; Uchida, Haruhiko; Inami, Mitsuru; Furuhashi, Tatsuo; Hino, Yasuhiko; and Sugimura, Hideo, 4,942,048, Cl. 426-271.000.

Ogura, Hiroo: *See*—
Sugimoto, Hachiro; Nakamura, Takaharu; Tsuchiya, Yutaka; Sugumi, Hiroyuki; Higurashi, Kunizou; Karibe, Norio; Yamanishi, Yoshiharu; Ogura, Hiroo; Araki, Shin; Kubota, Atsuhiko; Ohtake, Michiko; and Tamatsu, Kiyomi, 4,942,169, Cl. 514-318.000.

Oh, Heung-chul: *See*—
Park, Hak-song; Choi, Byoung-jin; and Oh, Heung-chul, 4,942,447, Cl. 357-42.000.

Ohashi, Michiya, to Tomy Company, Ltd. Light projecting toy musical box. 4,942,502, Cl. 362-35.000.

Ohashi, Mitsuo: *See*—
Masuzawa, Kuniyoshi; Okamura, Kyuya; Nishino, Keigo; Ohashi, Mitsuo; and Awano, Katsuya, 4,942,245, Cl. 548-329.000.

Ohata, Isao: *See*—
Kojima, Tadao; Kageyama, Shunji; Okada, Minoru; Ohata, Isao; and Sato, Noboru, 4,942,242, Cl. 548-192.000.

Ohba, Shinya: *See*—
Akimoto, Hajime; Ohba, Shinya; and Ozaki, Toshifumi, 4,942,474, Cl. 358-213.110.

Ohe, Kazuhide; Sato, Kazuo; Fukuda, Shunpei; and Nakada, Hiroyuki, to TDK Corporation. Cigarette lighter. 4,941,818, Cl. 431-268.000.

Ohishi, Masahiro; and Ohtomo, Fumio, to Kabushikikaisha Topcon. Delay time measuring device. 4,942,561, Cl. 368-118.000.

Ohki, Junichi: *See*—
Koga, Toshio; Ohki, Junichi; Ohta, Mutsumi; and Kunihiro, Hideto, 4,942,476, Cl. 358-335.000.

Ohkura, Seisaku: *See*—
Hara, Yoshimasa; Ohkura, Seisaku; Iijima, Fumio; Tamura, Isamu; Fukai, Tetsuro; Tagiri, Sumiho; and Takagi, Norimasa, 4,941,794, Cl. 414-341.000.

Ohmori, Akira; and Yasuhara, Takashi, to Daikin Industries, Ltd. Alpha-fluoroacrylic acid polymer and its use. 4,942,205, Cl. 525-326.200.
Ohmori, Toshiaki: *See*—
Kamimura, Yasuo; Ohmori, Toshiaki; Yanagi, Motonori; Fukumoto, Takaaki; and Hama, Masaharu, 4,941,489, Cl. 134-95.000.
Ohno, Motoshi: *See*—
Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; Nakata, Takashi; and Horaguchi, Yoichi, 4,942,420, Cl. 355-27.000.
Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.
Ohno, Yasuko: *See*—
Murayama, Masakazu; Kimura, Ken; Nakajima, Hiroyuki; Ohno, Yasuko; and Zidai, Eiki, 4,942,190, Cl. 523-400.000.
Ohrle, Rolf; and Herlemann, Werner, to Daimler-Benz AG. Method for installing a cavity seal element inserted in a groove and an apparatus for setting a spacing of the groove. 4,941,707, Cl. 296-216.000.
Ohsaki, Tsutomu; Sakakibara, Jinsaku; and Kuriki, Takeo, to Hoechst Japan Limited. Imidazothiadiazine derivatives, and their use as medicaments. 4,942,143, Cl. 514-222.800.
Ohsawa, Tsuneyuki: *See*—
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Suzuki, Yasushi; Takahara, Yasuo; Masui, Atusi; Ohshima, Toshihiro; Takeuchi, Fumihiro; Sagiyama, Toshiki; and Setoguchi, Tadashi, 4,941,437, Cl. 123-41.120.
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Nagasaka, Yasuhiro; Shiga, Tsuneo; Shiraki, Kazuyuki; Maeda, Akira; Hashizawa, Shigemi; and Ohtaka, Kazuto, 4,941,839, Cl. 439-352.000.
Ohtake, Michiko: *See*—
Sugimoto, Hachiro; Nakamura, Takaharu; Tsuchiya, Yutaka; Sugumi, Hiroyuki; Higurashi, Kunizou; Karibe, Norio; Yamanishi, Yoshiharu; Ogura, Hiroo; Araki, Shin; Kubota, Atsuhiko; Ohtake, Michiko; and Tamatsu, Kiyomi, 4,942,169, Cl. 514-318.000.
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Ohishi, Masahiro; and Ohtomo, Fumio, 4,942,561, Cl. 368-118.000.
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Nakazawa, Hitoshi; Ohtsuka, Mari; Matsuda, Hideaki; Katori, Tatsuhiko; and Irinoda, Kazuhiko, 4,942,172, Cl. 514-441.000.
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Ohwada, Jun-ichi: *See*—
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Oikawa, Shinro: *See*—
Uematsu, Ryosuke; Shindo, Kazunori; Kariya, Yoshinobu; and Oikawa, Shinro, 4,942,475, Cl. 355-256.000.
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Okada, Minoru: *See*—
Kojima, Tadao; Kageyama, Shunji; Okada, Minoru; Ohata, Isao; and Sato, Noboru, 4,942,242, Cl. 548-192.000.
Okada, Sensuke: *See*—
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Terashita, Takaaki; and Okada, Sethuo, 4,942,424, Cl. 355-38.000.
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Oktan AB: *See*—
Wicen, Jan, 4,941,439, Cl. 123-193.00P.
Okuda, Yasuji: *See*—
Inoue, Hiroshi; Yokono, Wataru; and Okuda, Yasuji, 4,942,185, Cl. 521-54.000.
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Horan, Gerald P.; Wickmann, John T.; and Olak, Richard C., 4,941,765, Cl. 403-107.000.
Old, Ralph N., Sr. Bridle bit. 4,941,312, Cl. 54-8.000.
Olsson, Lennart, to Frigoscandia Contracting AB. Conveyor belt. 4,941,567, Cl. 198-778.000.
Olsson, Nils A., to American Telephone and Telegraph Company. Polarization independent optical amplifier apparatus. 4,941,738, Cl. 350-377.000.
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Hasegawa, Hiroshi, 4,941,457, Cl. 128-6.000.
Miyazawa, Azuma; and Maruyama, Atsushi, 4,942,417, Cl. 354-400.000.
Omni World, Inc.: *See*—
Poo, Kent, 4,941,658, Cl. 272-56.50R.
Omron Tateisi Electronics Co.: *See*—
Sakano, Makio; and Hirase, Kiyoto, 4,942,513, Cl. 364-184.000.
Oms, Inc.: *See*—
Hoel, Jeffrey H.; Martinez, Eduardo D.; and Valdes, Jacobo, 4,942,541, Cl. 364-519.000.
Ong, Helen H.: *See*—
Schonafinger, Karl; and Ong, Helen H., 4,942,168, Cl. 514-313.000.
Onishi, Takashi: *See*—
Mori, Toshiki; Suzuki, Shigeaki; and Onishi, Takashi, 4,942,262, Cl. 568-32.000.
Ono, Ken'ichi: *See*—
Matsuoka, Morito; and Ono, Ken'ichi, 4,941,915, Cl. 204-298.120.
Onoda, Toshiaki: *See*—
Nakamura, Ken; Onoda, Toshiaki; and Gofuku, Yoshihiro, 4,941,640, Cl. 248-562.000.
Onodera, Kaoru: *See*—
Kajiwara, Makoto; Onodera, Kaoru; Kimura, Toshio; and Komorita, Kazuo, 4,942,121, Cl. 430-583.000.
Onodera, Yoichi: *See*—
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Opal, Inc.: *See*—
Halavee, Uriel; Niv, Israel; and Schwarzkopf, Tzila, 4,941,980, Cl. 250-310.000.
Orlandi, Alessio, to Galatron S.r.l. Mixing valve for hot and cold water. 4,941,509, Cl. 137-625.170.
Orlicki, David M.; Koppe, Bruce E.; and Palone, Thomas W., to Eastman Kodak Company. Torque measuring and transmitting system for a web spooling mechanism. 4,942,343, Cl. 318-6.000.
Orlowski, Thomas E.: *See*—
Genovese, Frank C.; and Orlowski, Thomas E., 4,942,110, Cl. 430-198.000.
Ortel Corporation: *See*—
Ungar, Jeffrey E., 4,942,585, Cl. 372-44.000.
Orth, Winfried; Hassler, Michael; Kleffner, Hans W.; and Weiss, Wolfgang, to Rutgerswerke AG. Process for the production of 2-hydroxypyridine. 4,942,239, Cl. 546-290.000.
Ortho Pharmaceutical Corporation: *See*—
Lambelet, Lawrence E., Jr.; and Frazier, Thomas A., 4,941,598, Cl. 222-321.000.
Ortkrass, Gerd: *See*—
Barwig, Karlhorst; Ortkrass, Gerd; and Klimasek, Guenther, 4,941,720, Cl. 350-96.200.
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Gast, William F.; and Rhodes, Charles F., Jr., 4,942,361, Cl. 324-360.000.
Osaka Prefecture: *See*—
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Murahashi, Shunichi; and Naota, Takeshi, 4,942,220, Cl. 528-336.000.
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Hoover, Alan A.; and Osborne, Gary T., 4,941,388, Cl. 84-726.000.
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Oshima, Hideaki: *See*—
Suzuki, Osamu; Ishiwata, Syousuke; Hayashi, Mitsuroh; and Oshima, Hideaki, 4,941,346, Cl. 73-54.000.
Otomura, Satoshi: *See*—
Kitajima, Ryouichi; and Otomura, Satoshi, 4,942,104, Cl. 430-56.000.
Otsuka, Yuzo, to AB Tetra Pak. Apparatus for cutting web for beverage containers. 4,941,376, Cl. 83-100.000.
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Owen, John M.: *See*—
Ivey, Paul C.; and Owen, John M., 4,941,317, Cl. 60-39.093.
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Tanaka, Norio; Kakuta, Takuya; Oya, Eiichi; and Baba, Masatoshi, 4,942,246, Cl. 548-367.000.
Ozaki, Hideharu, to NEC Corporation. Logic circuit system with latch circuits for reliable scan-path testing. 4,942,577, Cl. 371-22.300.
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Akimoto, Hajime; Obba, Shinya; and Ozaki, Toshifumi, 4,942,474, Cl. 358-213.110.
Ozaki, Toshinori: *See*—
Kitano, Makoto; Kawai, Sueo; Nishimura, Asao; Miura, Hideo; Yaguchi, Akihiro; Kitabayashi, Chikako; Shimizu, Ichio; Hatsuda, Toshio; Ozaki, Toshinori; Hattori, Toshio; and Sakata, Souji, 4,942,452, Cl. 357-68.000.
Ozaki, Yutaka: *See*—
Sumi, Kazuhiko; Hashimoto, Manabu; Sakaue, Yoshikazu; Aita, Kazuo; Sasakura, Masahiro; and Ozaki, Yutaka, 4,942,618, Cl. 382-8.000.
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Ozika, Takehiro: *See*—
Mori, Sanae; Sasaki, Takayosi; and Ozika, Takehiro, 4,941,269, Cl. 33-783.000.
Ozin, Geoffrey A.; Godber, John; and Stein, Andreas. Photosensitive, radiation sensitive, thermally sensitive and pressure sensitive silver sodalite materials. 4,942,119, Cl. 430-564.000.
P.S.M. International PLC: *See*—
Highfield, Anthony M., 4,941,788, Cl. 411-178.000.
Paar, Willibald; Schipfer, Rudolf; and Gmoser, Johann, to Vianova Kunstharz, A.G. Cathodically depositable electrodeposition paints. 4,942,196, Cl. 524-327.000.
Paccar Inc.: *See*—
Ellingsen, Svein, 4,941,671, Cl. 280-91.000.
Pacetti, Larry D.: *See*—
Ellingen, David R.; Michalski, Steven E.; Mieczkowski, Daniel; and Pacetti, Larry D., 4,942,356, Cl. 324-156.000.
Pacific Scientific Company: *See*—
Sommer, Holger T., 4,942,305, Cl. 250-574.000.
Packaging Concepts, Inc.: *See*—
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Avitan, Isaac; Allen, Ralph; Kellogg, David L.; Page, Stephen L.; and Radley, David J., 4,942,529, Cl. 364-424.010.
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Pajank, Heinrich: *See*—
Sandow, Jurgen K.; De Felice, Wilfried; Pajunk, Horst; and Pajunk, Heinrich, 4,941,874, Cl. 604-60.000.
Pajunk, Horst: *See*—
Sandow, Jurgen K.; De Felice, Wilfried; Pajunk, Horst; and Pajunk, Heinrich, 4,941,874, Cl. 604-60.000.
Pall Corporation: *See*—
Cordes, Harry, 4,941,900, Cl. 55-319.000.
Pallaske, Michael, to Desowag Materialschutz GmbH. Process for detecting insects. 4,941,356, Cl. 73-587.000.
Palmer, Christopher J.: *See*—
Casida, John E.; Palmer, Christopher J.; Larkin, John P.; and Smith, Ian H., 4,942,173, Cl. 514-452.000.
Palmer, Raymond J.; Bonnar, Gerard R.; and Moore, William E., to McDonnell Douglas Corporation. Vacuum resin impregnation process. 4,942,013, Cl. 264-511.000.
Palone, Thomas W.: *See*—
Bigelow, Donald O.; and Palone, Thomas W., 4,941,606, Cl. 226-118.000.
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Carpenter, James H., 4,941,295, Cl. 51-425.000.
Carpenter, James H., 4,941,296, Cl. 51-433.000.
Carpenter, James H., 4,941,297, Cl. 51-434.000.
Pangrazi, Ronald: *See*—
Mudge, Paul R.; Walker, James J.; and Pangrazi, Ronald, 4,942,086, Cl. 428-290.000.
Panicker, Ramachandra M. P.; and Agarwal, Anil K., to Micro Substrates, Inc. Ceramic substrate with metal filled via holes for hybrid microcircuits and method of making the same. 4,942,076, Cl. 428-137.000.
Pantaleo, Terese A.; and Perrin, Donald E. Water-filled glass toy. 4,941,590, Cl. 220-428.000.
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Laamayoux, Casimir; and Pantani, Antoine, 4,941,835, Cl. 439-152.000.
Park, Hak-song; Choi, Byoung-jin; and Oh, Heung-chul, to Samsung Electronics Co., Ltd. Borderless master slice CMOS device. 4,942,447, Cl. 357-42.000.
Park, Jae-Woon, to Samsung Electronics Co., Ltd. Method of making a call reservation and sending an interrupt tone in a private branch exchange (PBX). 4,942,601, Cl. 379-209.000.
Parker, Tim: *See*—
Fitch, John J.; and Parker, Tim, 4,942,410, Cl. 346-160.100.
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Gessaman, Bill; Lantz, Paul; and Parle, Jon, 4,942,401, Cl. 341-157.000.
Parr, David A. Ride-on device for transportation and stunt riding. 4,941,670, Cl. 280-87.021.
Parris, Gene E.; and Armor, John N., to Air Products and Chemicals, Inc. Process for preparing n-vinyl amides. 4,942,259, Cl. 564-187.000.
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Brayman, Theron R.; Pasek, Eugene A.; and Wall, Gregory D., 4,942,064, Cl. 427-297.000.
Pasik, Gregory E.: *See*—
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Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., 4,941,456, Cl. 128-6.000.
Pasini, Roberto, to Tubettificio Europa S.p.A. Axially compressible spool. 4,941,621, Cl. 242-118.100.
Paske, Richard R., Jr.: *See*—
Hainsworth, Thomas E.; Spanhak, F. Nicholaas; and Paske, Richard R., Jr., 4,942,531, Cl. 364-424.200.
Pate, Dwight W. Golf shot duplicator. 4,941,664, Cl. 273-35.00B.
Patel, Gautam A.: *See*—
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Patel, Gordhanbhai N.; Bolikal, Durgadas; and Bellemare, Richard A., to JP Laboratories, Inc. Pre-swelling and etching of plastics for plating. 4,941,940, Cl. 156-628.000.
Patel, Usha R.: *See*—
Aboo-Gharbia, Magid A.; Schiehser, Guy A.; and Patel, Usha R., 4,942,234, Cl. 544-332.000.
Paton, Anthony D.; Temple, Stephen; and Shepherd, Mark R. Drop-on-demand printhead. 4,942,409, Cl. 346-140.00R.
Patsch, Manfred: *See*—
Ruske, Manfred; and Patsch, Manfred, 4,942,232, Cl. 544-76.000.
Patt, Paul J.: *See*—
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Patterson, Charles B., Jr.: *See*—
Marlowe, Mickey O.; Rosenbaum, Herman S.; Rowland, Trevor C.; Patterson, Charles B., Jr.; and Davies, John H., 4,942,016, Cl. 376-418.000.
Paul Wurth S.A.: *See*—
Cimenti, Giovanni; Lonardi, Emile; and Mailliet, Pierre, 4,941,792, Cl. 414-208.000.
Pauly, Jean-Francois; and Roussel, Gerard, to Compagnie de Raffinage et de Distribution. Procedure for the continuous analysis of the chloride ions present in the overhead waters of a hydrocarbon distillation column. 4,942,133, Cl. 436-125.000.
Pautz, Anton; and Lang, Manfred, to Spinner GmbH, Elektrotechnische Fabrik. Optical fiber plug-in connection having a radially elastically supported plug pin. 4,941,728, Cl. 350-96.210.
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Chiesi, Paolo; and Pavesi, Luciana, 4,942,167, Cl. 514-226.500.
Pavlik, Charles M.: *See*—
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PBFB Licensing Corporation: *See*—
Avera, Fitzhugh L., 4,942,055, Cl. 426-633.000.
Peiffer, Dennis G.; Lundberg, Robert D.; and Duvdevani, Ilan, to Exxon Research and Engineering Company. Interfacial viscosification of aqueous solutions utilizing interpolymer complex. 4,942,189, Cl. 523-339.000.
Pelsue, Bradley A.; and Niksic, Mark R., to T. A. Pelsue Company. Ground tent with external frame and improved subframe therefor. 4,941,499, Cl. 135-104.000.
Pelton, John F., to Union Carbide Corporation. Protective lining for aluminum refining vessel. 4,941,647, Cl. 266-285.000.
Penoyer, John A. Contactless knurling process for winding of high modulus thermoplastic films. 4,942,000, Cl. 264-22.000.
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Peres, Philippe; and Deveaud, Vincent, to Gemplus Card International. Electrostatic protection device for electronic cards. 4,942,495, Cl. 361-220.000.
Perfetti, Patricia F.; and Andersen, Gary R., to R. J. Reynolds Tobacco Company. Cigarette. 4,941,485, Cl. 131-365.000.
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Matsumoto, Yukiei; and Shimamune, Takayuki, 4,941,953, Cl. 204-541.000.
Perper, Robert. Hydroelectric plant. 4,941,771, Cl. 405-78.000.
Perricone, Alphonse C.; Clapper, Dennis K.; and Enright, Dorothy P., to Baker Hughes Incorporated. Modified non-polluting liquid phase shale swelling inhibition drilling fluid. 4,941,981, Cl. 252-8.510.

Perrin, Donald E.: *See—*
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Perron, Robert: *See—*
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Person, Thomas C. Method and apparatus for preventing low-water failure in boilers. 4,941,435, Cl. 122-382.000.
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Peterson, John L.; and Howell, John R. Hybrid vapor-compression/liquid desiccant air conditioner. 4,941,324, Cl. 62-94.000.
Peterson, LuVerne R., to Unisys Corporation. Digital signal translator having compensation for P-channel and N-channel threshold voltage shifts. 4,942,398, Cl. 341-118.000.
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Petracek, Frank A.: *See—*
Belanger, Daniel J.; and Petracek, Frank A., 4,941,228, Cl. 15-245.000.
Petrik, Albert V. Ostomy pouch flusher. 4,941,878, Cl. 604-105.000.
Petrolite Corporation: *See—*
Zetlmeisl, Michael J.; and Outlaw, Benjamin T., 4,941,994, Cl. 252-389.230.
Pettersson, Bertil, to Hedemora AB. Method for clarifying green liquor. 4,941,945, Cl. 162-29.000.
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Dai, Pei-Shing E.; Sherwood, David E., Jr.; Bartley, Burton H.; and Petty, Randall H., 4,941,964, Cl. 208-216.0PP.
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Pfaffmann, George D.; Balzer, Norbert R.; Kubis, Charles S.; Walter, John; Currie, John P.; and Adams, Graham R., to Continental Can Company, Inc. Apparatus and method for sealing a lid onto a container. 4,941,306, Cl. 53-306.000.
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Sivan, Richard D.; Pfiester, James R.; and Leiss, John E., 4,942,137, Cl. 437-63.000.
Pharis, Richard P.; Looney, Norman E.; and Mander, Lewis N. Promotion of flowering in fruit trees. 4,941,908, Cl. 71-89.000.
Phelps, Martha A.: *See—*
Langemeier, Paul W.; Phelps, Martha A.; and Morgan, Michael E., 4,941,537, Cl. 166-308.000.
Philip Morris Incorporated: *See—*
Lowitz, David A., 4,942,363, Cl. 324-631.000.
Philippson, Walter M.; Brennan, Robert J.; and Meighen, Terrence, to Stewart Stamping Corp. Shielded plug jack connector. 4,941,848, Cl. 439-607.000.
Phillips, Cal M., to RTS Trainer Corporation. Bicycle trainer. 4,941,651, Cl. 272-73.000.
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Picanol N.V.: *See—*
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Kau, Jee I.; Pickelman, Dale M.; Schmidt, Donald L.; and Wessling, Ritchie A., 4,941,972, Cl. 210-490.000.
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Yant, Robert E.; and Piechuta, Mark E., 4,941,752, Cl. 366-307.000.
Pielkenrood Vinitex B.V.: *See—*
Cornelissen, Jan, 4,941,977, Cl. 210-521.000.
Pigiet, Vincent P., to Repligen Corporation. Hair removing composition and method containing thioredoxin, thioredoxin-derived, or thioredoxin-like dithiol peptides. 4,941,885, Cl. 8-161.000.
Pigott, Norman B., to Litton U. K. Limited. Automated guided vehicle system. 4,941,407, Cl. 104-289.000.
Pileski, Michael J.: *See—*
Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., 4,941,454, Cl. 128-4.000.
Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., 4,941,456, Cl. 128-6.000.
Pinck, Peter: *See—*
Heitmann, Uwe; Lorenzen, Heinz-Christen; Siems, Wolfgang; and Pinck, Peter, 4,941,482, Cl. 131-84.400.
Pinkerton, Harry E. Valveless positive displacement metering pump. 4,941,809, Cl. 417-500.000.
Pioneer Electronic Corporation: *See—*
Shiba, Takahumi, 4,942,567, Cl. 369-124.000.
Suzuki, Jun, 4,942,562, Cl. 369-44.110.
Pipkin, Noel J.: *See—*
Tank, Klaus; and Pipkin, Noel J., 4,941,891, Cl. 51-293.000.
Tank, Klaus; Pipkin, Noel J.; and Mastrantonis, Nicholas, 4,941,892, Cl. 51-309.000.
Pipon, Yves, to A. & M. Cousin - Etablissements Cousin/Freres. Safety slide with rollers for vehicle seats. 4,941,637, Cl. 248-430.000.
Pitney Bowes Inc.: *See—*
Francisco, Robert, 4,942,535, Cl. 364-478.000.
Gasiunas, Donatas V., 4,942,394, Cl. 340-870.310.
Pizzini, Gerard P.: *See—*
Ducarroir, Michel R.; Male, Germain J.; Nadal, Marcel F.; Basse, Alain G.; Pizzini, Gerard P.; and Cazajous, Didier P., 4,942,062, Cl. 427-249.000.
Platone, Edoardo: *See—*
Borgarello, Enrico; Carlini, Filippo M.; Neri, Carlo; and Platone, Edoardo, 4,942,179, Cl. 514-659.000.
Plessey Overseas Limited: *See—*
Dakin, John P., 4,941,747, Cl. 356-346.000.
Trundle, Clive, 4,942,113, Cl. 430-326.000.
Plumbo, Philip S.: *See—*
Marty, John L.; and Plumbo, Philip S., 4,941,596, Cl. 222-144.500.
Pochmarski, Luzian; and Koller, Otto, to Voest-Alpine Stahl Donawitz Gesellschaft m.b.H. Process for heating steel melts as well as device for performing this process. 4,941,913, Cl. 75-537.000.
Poe, Robert P., Jr.: *See—*
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,941,795, Cl. 414-403.000.
Pohl, Wolfgang: *See—*
Fauck, Gerhard; Pohl, Wolfgang; and Ulrich, Helmut, 4,941,510, Cl. 137-627.500.
Poirier, Alain. Device for reading directly from a chart the heading to be followed by an air or sea-going vehicle. 4,941,264, Cl. 33-457.000.
Polaroid Corporation: *See—*
Vetterling, William T., 4,942,436, Cl. 357-4.000.
Poletto, Giorgio, to Lorica S.p.A. Process for obtaining a synthetic chamois leather similar to natural chamois. 4,941,886, Cl. 8-497.000.
Pollock, Mark A.; Stowell, William J.; and Krutak, James J., to Eastman Kodak Company. Method of making a shaped polyester article. 4,942,005, Cl. 264-45.300.
Polston, Steve A. Automatic overlay feed apparatus for an overhead projector. 4,942,411, Cl. 353-26.00R.
Pommer, Ernst-Heinrich: *See—*
Buschmann, Ernst; Sproesser, Linhard; Zeeh, Bernd; Jung, Johann; Rademacher, Wilhelm; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,942,244, Cl. 548-268.200.
Ponce, Hector O.: *See—*
Butler, John M., III; and Ponce, Hector O., 4,942,326, Cl. 310-260.000.
Ponpipom, Mitree M.: *See—*
Durette, Philippe L.; Ponpipom, Mitree M.; and Hagmann, William K., 4,942,154, Cl. 514-26.000.
Poo, Kent, to Omni World, Inc. Fabricated amusement platform. 4,941,658, Cl. 272-56.50R.
Pope, G. Michael; and Kerr, Donald F., to Entech Corporation. Municipal waste thermal oxidation system. 4,941,415, Cl. 110-235.000.
Poret, Mark: *See—*
Fleck, Rod; Poret, Mark; Mattheis, Karl-Heinz; Magana, Javier; and Meinhold, Christoph, 4,942,559, Cl. 368-113.000.
Porter, Gary L.; and Cade, William B., to Texaco Inc. Manual port closing tool for well cementing. 4,941,535, Cl. 166-285.000.
Posdal, James R., to Kraft, Inc. Method for producing blocks of cheese curd. 4,942,052, Cl. 426-512.000.
Post, Robert M.: *See—*
Weiss, Susan R. B.; Post, Robert M.; and Aigner, Thomas G., 4,942,182, Cl. 514-812.000.
Potts, Rodney M.: *See—*
Wade, John R.; Burch, Jeremy R.; and Potts, Rodney M., 4,942,111, Cl. 430-273.000.
Povio, Raymond A.: *See—*
Kneisel, Charles S.; Mahon, Kenneth B.; and Povio, Raymond A., 4,942,435, Cl. 355-311.000.
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., to United States of America, Agriculture; and Cornell Research Foundation, Inc. Organic nitriles as insect antifeedants. 4,942,247, Cl. 548-505.000.
Powell, Richard L.: *See—*
Conti-Ramsden, John N.; Head, Robert A.; Powell, Richard L.; and Young, Brian D., 4,942,203, Cl. 525-185.000.
PPG Industries, Inc.: *See—*
Barch, Herbert W.; and Marshall, William P., 4,941,904, Cl. 65-1.000.
Jensen, Thomas H., 4,941,903, Cl. 65-1.000.
Novy, Paul M., 4,942,248, Cl. 548-533.000.
Van Buskirk, Elior J.; and Maska, Rudolf, 4,942,193, Cl. 524-276.000.
Praca, Miguel M.: *See—*
Darden, Julius C.; Praca, Miguel M.; and Tomasi, Philip J., 4,941,841, Cl. 439-377.000.
Prager, Howard A. Portable lounge. 4,941,222, Cl. 5-111.000.
Prather, William R.; Wong, Warren; and Hafdahl, Palmer. Walker. 4,941,497, Cl. 135-67.000.
Pratt, George W., Jr., to Massachusetts Institute of Technology. Multivariable analysis of bone condition. 4,941,474, Cl. 128-660.010.
Pratt, James O.: *See—*
McIntosh, Kenneth B.; Pratt, James O.; and Stout, Donald E., 4,942,544, Cl. 364-569.000.
Prelec, Krsto: *See—*
Hershcovitch, Ady; Kovarik, Vincent J.; and Prelec, Krsto, 4,942,339, Cl. 315-111.810.

President and Fellows of Harvard College: *See*—
Church, George M.; and Kieffer-Higgins, Stephen, 4,942,124, Cl. 435-6.000.
Tabor, Stanley; and Richardson, Charles C., 4,942,130, Cl. 435-194.000.
Prewer, Brian E.; and Milner, Brian, to Thorn Emi Electronics Limited. Radiation absorber and method of making it. 4,942,402, Cl. 342-1.000.
Price, John S., to Price, John Sterling. Disposable bag with attached napkin. 4,941,756, Cl. 383-127.000.
Price, John Sterling: *See*—
Price, John S., 4,941,756, Cl. 383-127.000.
Price, Richard. Cabinet with elevating shelf. 4,942,328, Cl. 312-306.000.
Prime Computer, Inc.: *See*—
Langendorf, Brian K., 4,942,520, Cl. 364-200.000.
Prince, Kendall W. Reconstituted wood veneer covered structural elements. 4,942,084, Cl. 428-284.000.
Pritschins, Wolfgang: *See*—
Haubennestel, Karl-Heinz; and Pritschins, Wolfgang, 4,942,213, Cl. 528-28.000.
Procond Elettronica S.p.A.: *See*—
Ardit, Giuseppe; Cigana, Fiorenzo; and Magris, Renzo, 4,942,346, Cl. 318-280.000.
Procor Ltd.: *See*—
Wong, Stephen D., 4,941,411, Cl. 105-421.000.
Procter & Gamble Company, The: *See*—
Gibson, Michael S., 4,942,228, Cl. 536-119.000.
Wise, Rodney M., 4,941,988, Cl. 252-99.000.
Proepper, Wilhelm; Juenkerfeld, Harald; and Fischer, Georg, to Benz & Hilgers GmbH. Arrangement for transporting articles, in particular packages of rectangular box-shape. 4,941,562, Cl. 198-416.000.
Provence, Marc, to Salomon S.A. Cross country ski linkage apparatus including pre-stressed blade. 4,941,675, Cl. 280-615.000.
Pruitt, J. Crayton, to United States Surgical Corporation. Stapling process and device for use on the mesentery of the abdomen. 4,941,623, Cl. 227-19.000.
Przezdziecki, Wojciech M., to Eastman Kodak Company. Thermally processable imaging element comprising an overcoat layer. 4,942,115, Cl. 430-523.000.
Pschellok, Waldemar: *See*—
Brunner, Heinz; and Pschellok, Waldemar, 4,941,605, Cl. 226-97.000.
Puletti, Paul: *See*—
Flanagan, Thomas P.; and Puletti, Paul, 4,942,195, Cl. 524-294.000.
Pullman Leasing Company: *See*—
Miller, Roy W., 4,941,695, Cl. 292-256.500.
Pusch, Werner; and Ullrich, Martin, to Bayer Aktiengesellschaft. Extruder with ceramic processing unit. 4,941,748, Cl. 366-85.000.
Quantum Technologies, Inc.: *See*—
Yant, Robert E.; and Piechuta, Mark E., 4,941,752, Cl. 366-307.000.
Queen, David S.: *See*—
Bell, Peter W.; Queen, David S.; and Smith, John B., 4,942,074, Cl. 428-95.000.
Queen's University at Kingston: *See*—
Goosen, Matheus F. A.; King, Glenn A.; Daugulis, Andrew J.; and Faulkner, Peter, 4,942,129, Cl. 435-182.000.
Querzola, Giuseppe; and Epis, Gino, to S.I.P.C.A.M. - Societa Italiana Prodotti Chimici e per l'Agricoltura Milano S.p.A. Process for the production of chlorothalonyl. 4,942,250, Cl. 558-411.000.
Quinn, George D.; and Goulet, Raymond L., to United States of America, Army. Articulating flexure test fixture. 4,941,359, Cl. 73-851.000.
Qureshi, Humayun; Liffmann, Stanley M.; and Czaban, John D. Multimode differential fluid displacement pump. 4,941,808, Cl. 417-415.000.
R. J. Reynolds Tobacco Company: *See*—
Clapp, William L.; and Fagg, Barry S., 4,941,484, Cl. 131-297.000.
Perfetti, Patricia F.; and Andersen, Gary R., 4,941,485, Cl. 131-365.000.
Ridings, Henry T.; and Banerjee, Chandra K., 4,941,483, Cl. 131-194.000.
Rademacher, Wilhelm: *See*—
Buschmann, Ernst; Sproesser, Linhard; Zeeh, Bernd; Jung, Johann; Rademacher, Wilhelm; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,942,244, Cl. 548-268.200.
Radisensor AB: *See*—
Tenerz, Lars; Hook, Bertil; and Engstrom, Thomas, 4,941,473, Cl. 128-637.000.
Radley, David J.: *See*—
Avitan, Isaac; Allen, Ralph; Kellogg, David L.; Page, Stephen L.; and Radley, David J., 4,942,529, Cl. 364-424.010.
Ragnarsson, Gert A.; Silfverstrand, Kajsa M.; and Sjogren, John A., to Aktiebolaget Hassle. Pharmaceutical preparation and a process for its preparation. 4,942,040, Cl. 424-486.000.
Raguin, Michel M.: *See*—
Joyce, Thomas F.; Kelly, Richard P.; Shen, Jian-Kuo; and Raguin, Michel M., 4,942,547, Cl. 364-748.000.
Raisa, Luigi: *See*—
Greco, Alberto; and Raisa, Luigi, 4,942,215, Cl. 528-114.000.
Rajamannan, A. H. J. Composition and process for use in neutralizing malodorous gases. 4,941,991, Cl. 252-189.000.
Rakov, David M.; and Manico, Joseph A., to Eastman Kodak Company. Method and apparatus for annotating electrophotographic prints of photographic negatives. 4,942,427, Cl. 355-202.000.
Rakov, David M.; and Manico, Joseph A., to Eastman Kodak Company. Method and apparatus for annotating electrophotographic prints of photographic negatives. 4,942,428, Cl. 355-202.000.
Ramakrishnan, Rengaswamy; and Callaway, Michael D., to U.S. Natural Resources, Inc.,. Retrofit drainage trough for installation on pre-existent cabinet contained, wall supported air conditioners. 4,941,901, Cl. 62-262.000.
Rambaut, Michel, to Commissariat a l'Energie Atomique. System for the suppression of noise and its variations for the detection of a pure signal in a measured noisy discrete signal. 4,942,546, Cl. 364-574.000.
Ranganath, Tirumala R.: *See*—
Nazarathy, Moshe; Zorabedian, Paul; Richard, William; and Ranganath, Tirumala R., 4,942,583, Cl. 372-20.000.
Ransburg-Gema AG: *See*—
Lehmann, Robert, 4,941,778, Cl. 406-28.000.
Raphael, Ralph A.: *See*—
Bushell, Michael J.; and Raphael, Ralph A., 4,942,264, Cl. 568-635.000.
Raybould, Derek; Fish, Gordon E.; and Denk, Joseph, to Allied-Signal Inc. Permanent magnet rotor with bonded sheath. 4,942,322, Cl. 310-156.000.
Raybuck, William, to Stacker Machine Co., Inc. Vacuum counter for stacked signatures. 4,941,650, Cl. 270-95.000.
Rayburn, Charles C. Capacitive structure. 4,942,610, Cl. 361-309.000.
Raychem Corporation: *See*—
Gamarra, Jose P., 4,942,270, Cl. 174-93.000.
Raymond Corporation, The: *See*—
Avitan, Isaac; Allen, Ralph; Kellogg, David L.; Page, Stephen L.; and Radley, David J., 4,942,529, Cl. 364-424.010.
Real, Peter, to Signal Processing Technologies, Inc. Elimination of linearity superposition error in digital-to-analog converters. 4,942,397, Cl. 341-118.000.
Reale, John, Jr.: *See*—
Bartels, Craig R.; and Reale, John, Jr., 4,941,976, Cl. 210-490.000.
Redekop, Alfred W. J.; and Barnes, Derek, to MacMillan Bloedel Limited. Finger jointing green lumber. 4,941,521, Cl. 144-347.000.
Reedy, Gerald T.: *See*—
Johnson, Stanley A.; Reedy, Gerald T.; and Kumar, Romesh, 4,942,297, Cl. 250-304.000.
Reichmann, Michael H.: *See*—
Gordon, Alastair T.; and Reichmann, Michael H., 4,942,599, Cl. 379-93.000.
Reid, Dwight K., to Betz Laboratories, Inc. Method for inhibiting gum formation in liquid hydrocarbon mediums. 4,941,968, Cl. 208-236.000.
Reimann, Herbert: *See*—
Moller, Antonius; Reimann, Herbert; Schurmann, Bernhard; and Wilts, Gerold, 4,942,571, Cl. 370-85.100.
Reimert, Larry E., to Dril-Quip, Inc. Subsea wellhead equipment. 4,941,691, Cl. 285-39.000.
Reiner, Klaus; Rieker, Heinz; and Stoll, Josef, to Daimler-Benz AG. Device for determining the mass of a motor vehicle. 4,941,365, Cl. 73-865.000.
Reinertz, Ulrich; Troger, Wolfgang; and Wockel, Jurgen, to Vorwerk & Co. Interholding GmbH. Method and apparatus for thoroughly mixing a suspension containing a fluid and solid matter constituents. 4,941,399, Cl. 222-401.000.
Reiniger, Haigh M., to Altomar-II Trust by Kenneth Safe, Jr., Trustee. Process for making cellulose-containing products and the products made thereby. 4,942,081, Cl. 428-218.000.
Reinking, Klaus: *See*—
Bier, Peter; Reinking, Klaus; Bottenbruch, Ludwig; and Tresper, Erhard, 4,942,194, Cl. 524-281.000.
Reithel, Raymond F.; and Sutton, Richard C., to Eastman Kodak Company. Solid state color imaging sensor having a color filter array. 4,942,103, Cl. 430-7.000.
Reitman, William, to Grumman Aerospace Corporation. Real time color display. 4,942,388, Cl. 340-701.000.
Reliable Knitting Works: *See*—
Blutstein, Morton, 4,941,211, Cl. 2-202.000.
Renggli, Franz; and Joder, Andreas, to LGZ Landis & Gyr Zug AG. Arrangement for the transformation of an electrical multiphase signal into a frequency. 4,942,310, Cl. 307-271.000.
Renner, Gunter, to Agfa-Gevaert Aktiengesellschaft. Color photographic recording material containing 2-equivalent magenta couplers. 4,942,116, Cl. 430-555.000.
Reparaz, Adolfo: *See*—
Busselman, Gary J.; and Reparaz, Adolfo, 4,942,015, Cl. 376-261.000.
Repligen Corporation: *See*—
Pigiet, Vincent P., 4,941,885, Cl. 8-161.000.
Repp, John D.: *See*—
Herbert, Edward; Repp, John D.; and Cebry, Stephen E., 4,942,353, Cl. 323-361.000.
Research Development Corporation of Japan: *See*—
Okada, Masao; Sakai, Kazuhiko; Kimura, Haruo; and Ikada, Yoshito, 4,941,870, Cl. 600-36.000.
Research Education Institute, Inc.: *See*—
Imagawa, David T.; Lee, Moon H.; and Sano, Kouichi, 4,942,122, Cl. 435-5.000.
Reu, Winfried. Method of making protective caps for threaded pipe ends or pipe sockets and protective cap made by said method. 4,941,934, Cl. 156-195.000.
Rexnord Corporation: *See*—
Thuerman, John H., 4,941,315, Cl. 59-78.000.
Reynolds, Richard W.; and Stroze, Mark S., to Sundstrand Corporation. Bent-axis hydraulic apparatus. 4,941,395, Cl. 92-57.000.
Rheinmetall GmbH: *See*—
Ortmann, Helmut; and Scharnhorst, Rolf, 4,941,244, Cl. 29-1.200.
Rhodes, Charles F., Jr.: *See*—
Gast, William F.; and Rhodes, Charles F., Jr., 4,942,361, Cl. 324-360.000.

Rhone-Poulenc Chimie: *See—*
Bluthe, Norbert; and Perron, Robert, 4,942,240, Cl. 546-298.000.
Riback, Richard; and Will, Eric, to Expert Corporation. Ball controlled float control unit. 4,942,274, Cl. 200-84.00C.
Ricci, Elizabeth G.: *See—*
Black, Darryl P.; and Ricci, Elizabeth G., 4,942,540, Cl. 364-514.000.
Richard, William: *See—*
Nazarathy, Moshe; Zorabedian, Paul; Richard, William; and Ranganath, Tirumala R., 4,942,583, Cl. 372-20.000.
Richards, Marc F., to Scott Paper Company. Natural preservative composition for wet wipes. 4,941,995, Cl. 252-407.000.
Richardson, Charles C.: *See—*
Tabor, Stanley; and Richardson, Charles C., 4,942,130, Cl. 435-194.000.
Richardson, Sandy: *See—*
Butler, John H. A.; and Richardson, Sandy, 4,941,879, Cl. 604-110.000.
Richert, Hans. Method and apparatus for the measurement of accelerations. 4,941,355, Cl. 73-517.00R.
Richetta, Raymond A.: *See—*
Buchholtz, Timothy C.; Gruver, Michael R.; Richetta, Raymond A.; and Schmerbeck, Timothy J., 4,942,399, Cl. 341-143.000.
Richter, Matthias: *See—*
Hartel, Volker; Heynemann, Carl; Hundt, Werner; Muller, Siegfried; and Richter, Matthias, 4,942,075, Cl. 428-109.000.
Richter, Wolfgang-Dieter; Weeger, Engelbert; Uebel, Lutz; and Foerster, Erhard, to MAN Gutehoffnungshutte AG; and Bremer Strassenbahn AG. Wheel set guidance for trucks of rail vehicles, especially commuter traffic vehicles. 4,941,409, Cl. 105-157.100.
Ricoh Company, Ltd.: *See—*
Kakitani, Yohtaro, 4,942,429, Cl. 355-208.000.
Kitajima, Ryouichi; and Otomura, Satoshi, 4,942,104, Cl. 430-56.000.
Mashiko, Harumitsu; Suzuki, Shigeru; and Seto, Takashi, 4,942,422, Cl. 355-28.000.
Nakai, Junji; and Ishikawa, Sakae, 4,942,434, Cl. 355-290.000.
Shigemori, Toshihiro, 4,942,370, Cl. 331-1.00A.
Ridgely Products co., Inc.: *See—*
Kramer, David N.; and Snow, Philip A., 4,941,989, Cl. 252-102.000.
Ridings, Henry T.; and Banerjee, Chandra K., to R. J. Reynolds Tobacco Company. Aerosol delivery article. 4,941,483, Cl. 131-194.000.
Riebel, Hans-Jochem: *See—*
Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,912, Cl. 71-92.000.
Riede, Urs N.; and Spitaler, Ulrich, to Rutgerswerke AG. Method of protecting fish. 4,942,181, Cl. 514-730.000.
Rieker, Heinz: *See—*
Reiner, Klaus; Rieker, Heinz; and Stoll, Josef, 4,941,365, Cl. 73-865.000.
Rieter Machine Works, Ltd.: *See—*
Nabulon, Werner, 4,941,242, Cl. 28-255.000.
Rikagaku Kenkyusho: *See—*
Arai, Shigeyoshi; Sugita, Kyoko; Isomura, Shohei; and Kaetsu, Hayato, 4,941,956, Cl. 204-157.200.
Rinaldi, George M., to Rinaldi, George Matthew. Two-piece body fishing lure. 4,941,280, Cl. 43-42.360.
Rinaldi, George Matthew: *See—*
Rinaldi, George M., 4,941,280, Cl. 43-42.360.
Ripy, Paul B.: *See—*
Earnshaw, William E.; Howell, Jay; and Ripy, Paul B., 4,942,575, Cl. 371-10.100.
Rivola, Giovanni: *See—*
Cassinelli, Giuseppe; Grein, Arpad; Merli, Sergio; and Rivola, Giovanni, 4,942,155, Cl. 514-34.000.
Roark, Roger W.; Cairns, Glenn R.; and Rowe, Edward A., Jr., to Occidential Chemical Corporation. Perchloroethylene stabilization. 4,942,267, Cl. 570-109.000.
Robert Bosch GmbH: *See—*
Conzelmann, Gerhard; Nagel, Karl; and Fiedler, Gerhard, 4,942,308, Cl. 307-202.100.
Denz, Helmut; Moz, Rudolf; and Uttenweiler, Winfried, 4,941,446, Cl. 123-414.000.
Hoptner, Wolfgang; Perenthaler, Egbert; and Schwarz, Helmut, 4,941,449, Cl. 123-490.000.
Kirn, Manfred, 4,941,790, Cl. 411-432.000.
Robertshaw Controls Company: *See—*
Kronau, Paul D., 4,942,351, Cl. 318-642.000.
Robinson Foundry, Inc.: *See—*
Robinson, Richard H., 4,941,644, Cl. 251-360.000.
Robinson, Merritt A.: *See—*
Loran, William; and Robinson, Merritt A., 4,941,826, Cl. 433-51.000.
Robinson, Richard H., to Robinson Foundry, Inc. Valve stem. 4,941,644, Cl. 251-360.000.
Rochford, Kent B.: *See—*
Trend, John E.; and Rochford, Kent B., 4,941,996, Cl. 252-584.000.
Rockefeller University, The: *See—*
Henderson, Graeme B.; Ulrich, Peter C.; and Cerami, Anthony, 4,942,170, Cl. 514-326.000.
Rockwell International Corporation: *See—*
Newman, Paul R.; and Cunningham, Patricia H., 4,942,078, Cl. 428-192.200.
Roesky, Werner; Deffner, Dieter; and Wolter, Manfred, to Sante Corporation. Method of disposing of salt-containing dusts from incinerator plants. 4,941,772, Cl. 405-128.000.
Rogers, John J.: *See—*
Moehle, William E.; Rogers, John J.; and Semen, John, 4,942,145, Cl. 501-90.000.
Rogers, John W., to Borden, Inc. Aldehyde condensation resin glue compositions having pea and other leguminous flour extenders. 4,942,191, Cl. 524-17.000.
Rohl, Peter: *See—*
Jitschin, Wolfgang; and Rohl, Peter, 4,941,351, Cl. 73-431.000.
Rohm Co., Ltd.: *See—*
Ohtani, Kenji; and Murayama, Yorinobu, 4,942,347, Cl. 318-434.000.
Rolek, Matthew, to Ardco, Inc. Refrigerator door frame with insulated mullion. 4,941,289, Cl. 49-504.000.
Roller, Hanno; and Starck, Roland, to Fritz Eichenauer GmbH & Co. KG. Electric heating element with PTC component. 4,942,289, Cl. 219-504.000.
Rolls-Royce plc: *See—*
Ivey, Paul C.; and Owen, John M., 4,941,317, Cl. 60-39.093.
Romano, Jack W. Curved bore drilling method and apparatus. 4,941,466, Cl. 606-80.000.
Rome, Carl P.: *See—*
Rome, Eugene P.; and Rome, Carl P., 4,941,716, Cl. 312-205.000.
Rome, Eugene P.; and Rome, Carl P. Cabinet construction. 4,941,716, Cl. 312-205.000.
Ronda, Cornelis R.: *See—*
Mutsaers, Cornelis A. H. A.; De Leeuw, Dagobert M.; Klaassen, Dirk B. M.; and Ronda, Cornelis R., 4,942,335, Cl. 313-468.000.
Root, Jeffrey M.: *See—*
Winter, Daryl B.; Meyer, Richard S.; Root, Jeffrey M.; and Campbell, Michael L., 4,942,054, Cl. 426-611.000.
Roovers, Wilhelmus M. M.: *See—*
Hamersma, Wilhelmus Jozefus L. A.; de Boer, Jan; Roovers, Wilhelmus M. M.; and de Wit, Gerrit, 4,942,188, Cl. 523-212.000.
Rose, Philip I.: *See—*
King, Scott A.; Rose, Philip I.; and Maskasky, Joe E., 4,942,120, Cl. 430-567.000.
Rosenbaum, Herman S.: *See—*
Marlowe, Mickey O.; Rosenbaum, Herman S.; Rowland, Trevor C.; Patterson, Charles B., Jr.; and Davies, John H., 4,942,016, Cl. 376-418.000.
Rosenberg, E. William; and Belew-Noah, Patricia W., to University of Tennessee Research Corporation. Topical treatment of seborrheic dermatitis with ketoconazole. 4,942,162, Cl. 514-252.000.
Ross, John C. Multi-bladed propulsion apparatus. 4,941,802, Cl. 416-164.000.
Ross, Robert H., to Seco/Warwick Corporation. Vertical air flow ingot pusher furnace with adjustable side baffles. 4,941,823, Cl. 432-152.000.
Rother, Wolfgang: *See—*
Durr, Manfred; Unland, Georg; Rother, Wolfgang; Driemeier, Gunter; and Schmits, Heinz-Herbert, 4,941,821, Cl. 432-106.000.
Rotondo, Richard D., to Advanced Biologics, Inc. Treatment for Alzheimer's disease. 4,942,165, Cl. 514-261.000.
Rousseau, Jean-Paul: *See—*
Beranger, Herve ; Brunin, Armand; Caplier, Bruno; and Rousseau, Jean-Paul, 4,942,316, Cl. 307-455.000.
Roussel, Gerard: *See—*
Pauly, Jean-Francois; and Roussel, Gerard, 4,942,133, Cl. 436-125.000.
Rowe, Edward A., Jr.: *See—*
Roark, Roger W.; Cairns, Glenn R.; and Rowe, Edward A., Jr., 4,942,267, Cl. 570-109.000.
Rowland, John D.: *See—*
Harrell, Sarah R.; and Rowland, John D., 4,942,581, Cl. 372-9.000.
Rowland, Trevor C.: *See—*
Marlowe, Mickey O.; Rosenbaum, Herman S.; Rowland, Trevor C.; Patterson, Charles B., Jr.; and Davies, John H., 4,942,016, Cl. 376-418.000.
Rozman, Gregory I.; and Baits, Paul G., to Sundstrand Corporation. Method and apparatus for detecting prime mover start malfunction. 4,942,493, Cl. 361-23.000.
RTS Trainer Corporation: *See—*
Phillips, Cal M., 4,941,651, Cl. 272-73.000.
Ruch, Ola: *See—*
Johansen, Trond V.; Ruch, Ola; Naess, Ludvig; Kristjansson, K. P.; and Utengen, S. F., 4,941,511, Cl. 138-89.000.
Rudolf, Boris; and Gentischer, Josef, to C. & E. Fein GmbH & Co. Device for clamping a disc-shaped tool. 4,941,292, Cl. 51-168.000.
Ruele, Hans: *See—*
Kimmel, Helmut; and Ruele, Hans, 4,942,334, Cl. 313-414.000.
Ruff, John D., to Thermadyne, Inc. Ice maker and water purifier. 4,941,902, Cl. 62-532.000.
Ruggieri, Nicholas A. Spaghetti sipper. 4,942,044, Cl. 426-2.000.
Rugowski, James S.: *See—*
Wendt, Greg A.; Underhill, Kimberly K.; Rugowski, James S.; Kressner, Bernhardt E.; and Chiu, Kai F., 4,942,077, Cl. 428-152.000.
Ruhrgas Aktiengesellschaft: *See—*
Altemark, Detlef; Hess, Robert; and Hillringhaus, Karl H., 4,941,345, Cl. 73-23.200.
Rumph, George W.: *See—*
Arduesor, William A.; Rumph, George W.; and Anstey, Henry D., 4,941,311, Cl. 53-587.000.

Ruske, Manfred; and Patsch, Manfred, to BASF Aktiengesellschaft. Imidazolylmethylene-containing triphendioxazine dyes. 4,942,232, Cl. 544-76.000.

Russell, Anthony W.: *See*—
Russell, Michael K.; and Russell, Anthony W., 4,941,354, Cl. 73-517.00B.

Russell, John P.; Miller, Sam; and Carroll, Terry, to Infection Control Products, Inc. Surgical wrap with arm splint. 4,941,479, Cl. 128-877.000.

Russell, Michael K.; and Russell, Anthony W. Tri-axial accelerometers. 4,941,354, Cl. 73-517.00B.

Russell, Sid, to United Technologies Corporation. Airblast fuel nozzle. 4,941,617, Cl. 239-400.000.

Russell, Stephen D.; and Stamnitz, Timothy C., to United States of America, Navy. Tapered fiber amplifier. 4,941,726, Cl. 350-96.150.

Ruston Gas Turbines Limited: *See*—
Ivey, Paul C.; and Owen, John M., 4,941,317, Cl. 60-39.093.

Rutgerswerke AG: *See*—
Gardziella, Arno; and Kwasniok, Alois, 4,942,217, Cl. 528-129.000.
Orth, Winfried; Hassler, Michael; Kleffner, Hans W.; and Weiss, Wolfgang, 4,942,239, Cl. 546-290.000.
Riede, Urs N.; and Spitaler, Ulrich, 4,942,181, Cl. 514-730.000.

Rysavy, Peter B.: *See*—
Eppley, Mark; and Rysavy, Peter B., 4,941,845, Cl. 439-505.000.

Rytz, Gerhard; and Sloango, Mario, to Ciba-Geigy Corporation. Unsaturated derivatives of 2,2,6,6-tetramethylpiperidine. 4,942,238, Cl. 546-242.000.

S.I.P.C.A.M. - Societa Italiana Prodotti Chimici e per l'Agricoltura Milano S.p.A.: *See*—
Querzola, Giuseppe; and Epis, Gino, 4,942,250, Cl. 558-411.000.

S.M.F. International: *See*—
Bosgiraud, Jean-Michel; and Cendre, Andre, 4,941,776, Cl. 405-224.000.

Saari, Walfred S., to Merck & Co., Inc. Halogenated pyrimidine nucleosides and their derivatives. 4,942,226, Cl. 536-23.000.

Sabol, George P.: *See*—
Ammon, Robert L.; Buckman, Raymond W.; and Sabol, George P., 4,941,928, Cl. 148-2.000.

Saeguna, Takashi; Goto, Tetsuro; and Yasukawa, Seiichi, to Nikon Corporation. Camera. 4,942,413, Cl. 354-173.110.

Saeki, Hiroshi; Ikeda, Junji; and Ishimaru, Hajime, to Matsushita Electric Industrial Co., Ltd.; and Ishimaru, Hajima. Electrostatic dust collector for use in vacuum system. 4,941,224, Cl. 15-1.50R.

Saeki, Kazumi; Hirano, Masami; Oka, Kunihide; Tsukinuki, Kazuto; and Oikawa, Setsuo, to Yoshitomi Pharmaceutical Industries, Ltd. Process for the production of penicillanic acid compounds. 4,942,229, Cl. 540-310.000.

Saeki, Keiso; Endo, Tosiaki; Satomura, Masato; and Shinozaki, Fumiaki, to Fuji Photo Film Co., Ltd. Image-forming material and image recording method using the same. 4,942,107, Cl. 430-138.000.

Sago, Hiroyoshi; Mizuki, Hideyuki; Kudo, Katsuhiko; and Nakayama, Muneo, to Tokyo Ohka Kogyo Co., Ltd. Thin-film coating apparatus. 4,941,426, Cl. 118-52.000.

Sai, Kenji, to Japan Radio Co., Ltd. Phase-locked loop type synthesizer having modulation function. 4,942,374, Cl. 332-124.000.

Saintsing, Barry L.: *See*—
Dube, Michael F.; and Saintsing, Barry L., 4,941,486, Cl. 131-365.000.

Saito, Kazuya: *See*—
Watanabe, Kazuhiro; Saito, Kazuya; Yuchi, Yoshiyuki; and Inagawa, Konosuke, 4,941,430, Cl. 118-723.000.

Sakagawa, Tetsuo; Nakayama, Takayuki; Kunihiro, Hisanobu, deceased; and by Kunihiro, Masako, legal representative. Quinophthalone derivatives for dyeing denim cotton yarn, optionally with indigo dyes to give yellow, green or black shades. 4,941,887, Cl. 8-642.000.

Sakaguchi, Michiaki: *See*—
Kumagai, Motoo; Kato, Keiichi; Nagano, Masato; and Sakaguchi, Michiaki, 4,942,079, Cl. 428-209.000.

Sakai, Kazuhiko: *See*—
Okada, Masao; Sakai, Kazuhiko; Kimura, Haruo; and Ikada, Yoshito, 4,941,870, Cl. 600-36.000.

Sakai, Toshio: *See*—
Nakai, Hitoshi; and Sakai, Toshio, 4,942,419, Cl. 355-27.000.

Sakakibara, Jinsaku: *See*—
Ohsaki, Tsutomu; Sakakibara, Jinsaku; and Kuriki, Takeo, 4,942,143, Cl. 514-222.800.

Sakamoto, Katsumi: *See*—
Iio, Masahiro; Suzuki, Yoshio; Takayama, Hidehiko; and Sakamoto, Katsumi, 4,941,810, Cl. 418-15.000.

Sakamoto, Yujiro; Kurosaka, Toshio; Fukumoto, Hirohiko; Miyake, Toshiya; and Tokunaga, Hirohiko, to Kabushiki Kaisha Kobe Seiko Sho. Lift generating apparatus, in aircraft employing the lift generating apparatus, and a lift generating method. 4,941,628, Cl. 244-12.200.

Sakano, Makio; and Hirase, Kiyoto, to Omron Tateisi Electronics Co. Trouble diagnosis apparatus for controlled device. 4,942,513, Cl. 364-184.000.

Sakao, Masahito, to Kabushiki Kaisha Matsuyama Seisakusho. Remotely controlled rearview mirror for motor vehicles. 4,941,639, Cl. 248-549.000.

Sakata, Souji: *See*—
Kitano, Makoto; Kawai, Sueo; Nishimura, Asao; Miura, Hideo; Yaguchi, Akihiro; Kitabayashi, Chikako; Shimizu, Ichio; Hatsuda, Toshio; Ozaki, Toshinori; Hattori, Toshio; and Sakata, Souji, 4,942,452, Cl. 357-68.000.

Sakaue, Yoshikazu: *See*—
Sumi, Kazuhiko; Hashimoto, Manabu; Sakaue, Yoshikazu; Aita, Kazuo; Sasakura, Masahiro; and Ozaki, Yutaka, 4,942,618, Cl. 382-8.000.

Sakhpara, Dilip J., to W. L. Gore & Assoc. Inc. Flexible breathable polyurethane coatings and films, and the prepolymers from which they are made. 4,942,214, Cl. 528-59.000.

Sako, Shigeki, to Kabushiki Kaisha Toshiba. Plastic packaged device having a hollow portion enclosing a chip element. 4,942,456, Cl. 357-72.000.

Sakuma, Kyoko: *See*—
Masumura, Hidemi; Sakuma, Kyoko; and Ashida, Shinichiro, 4,942,171, Cl. 514-399.000.

Sakura Color Products Corp.: *See*—
Inoue, Hiroshi; Yokono, Wataru; and Okuda, Yasuji, 4,942,185, Cl. 521-54.000.

Sakurai, Mitsuo, to Yokohama Rubber Co., Ltd., The. Tire. 4,941,522, Cl. 152-523.000.

Salomon S.A.: *See*—
Provence, Marc, 4,941,675, Cl. 280-615.000.

Salter, James A.: *See*—
Dewitz, Thomas S.; Salter, James A.; McCusker, James J.; Scott, Andrew M.; and Dirkse, Hendricus A., 4,941,779, Cl. 406-138.000.

Saltzberg, Theodore: *See*—
Kotzin, Michael D.; Crisler, Kenneth J.; Mohl, Lawrence M.; Saltzberg, Theodore; Hong, Daehyoung; and Van den Heuvel, Anthony P., 4,942,570, Cl. 370-80.000.

Salzgitter Maschinenbau GmbH: *See*—
Tegtmeyer, Kurt, 4,941,404, Cl. 100-117.000.

Sam Bida: *See*—
Bida, Sam, 4,942,338, Cl. 315-111.710.

Samelson, Harry V., to Du Pont de Nemours, E. I., and Company. Spinneret for production of a hollow filament within a hollow filament composite fiber having spacing means. 4,941,812, Cl. 425-131.500.

Sampei, Keiichi; Kawasaki, Masami; Dei, Yoshito; Fukumoto, Katsumi; and Furukawa, Kazuo, to Kubota Ltd. Stepless speed change mechanism in belt transmission device. 4,941,863, Cl. 474-33.000.

Samsung Electro-Mechanics Co., Ltd.: *See*—
Moon, Frederick H., 4,942,368, Cl. 330-282.000.

Samsung Electronics Co., Ltd.: *See*—
Park, Hak-song; Choi, Byoung-jin; and Oh, Heung-chul, 4,942,447, Cl. 357-42.000.
Park, Jae-Woos, 4,942,601, Cl. 379-209.000.

Samukawa, Koji: *See*—
Seki, Masaki; Samukawa, Koji; and Hanaoka, Osamu, 4,942,350, Cl. 318-569.000.

Sandbank, Charles P.; Childs, Ian; and Storey, Richard, to British Broadcasting Corporation. Bandwidth compression for television signals. 4,942,466, Cl. 358-133.000.

Sander, Eugene H., to Muscatine Gene's, Inc. Sunflower based wild bird feed. 4,942,043, Cl. 426-2.000.

Sanderson, William A.; and King, David L., to Catalytica Associates, Inc. Process for the preparation of polymers having an inorganic backbone. 4,942,218, Cl. 528-381.000.

Sandow, Jurgen K.; De Felice, Wilfried; Pajunk, Horst; and Pajunk, Heinrich, to Hoechst Aktiengesellschaft. Device for the administration of implants. 4,941,874, Cl. 604-60.000.

Sandoz Ltd.: *See*—
Coates, Jacqueline A.; Farrar, John M.; and Graham, Margaret H., all of, 4,941,983, Cl. 252-8.515.

Sanford, Charles L., to Beloit Corporation. Headbox with grooved trailing element. 4,941,950, Cl. 162-343.000.

Sanger, Gareth J.; and Marr, Helen E., to Beecham Group p.l.c. Novel treatment. 4,942,160, Cl. 514-216.000.

Sano, Koichi; Yokoyama, Tetsuo; and Koizumi, Hideaki, to Hitachi, Ltd. Method of magnetic resonance imaging. 4,942,359, Cl. 324-309.000.

Sano, Kouichi: *See*—
Imagawa, David T.; Lee, Moon H.; and Sano, Kouichi, 4,942,122, Cl. 435-5.000.

Sano, Masafumi, to Canon Kabushiki Kaisha. Process for forming deposited film. 4,942,058, Cl. 427-431.000.

Sano, Shigeaki, to Toppan Moore Co., Ltd. Non-contacting power supplying system. 4,942,352, Cl. 320-2.000.

Sanquhar Tile Services Limited: *See*—
Bell, Peter W.; Queen, David S.; and Smith, John B., 4,942,074, Cl. 428-95.000.

Sanshin Kogyo Kabushiki Kaisha: *See*—
Takahashi, Hideharu; and Uchida, Yoshiaki, 4,941,854, Cl. 440-1.000.

Sante Corporation: *See*—
Roesky, Werner; Deffner, Dieter; and Wolter, Manfred, 4,941,772, Cl. 405-128.000.

Santel, Hans-Joachim: *See*—
Kirsten, Rolf; Kluth, Joachim; Feat, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,912, Cl. 71-92.000.
Muller, Klaus-Helmut; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,910, Cl. 71-92.000.

Santhanam, Anakkavur T.; and Conley, Edward V., to Kennametal Inc. Cermet cutting tool. 4,942,097, Cl. 428-552.000.

Santo, Philip J. Waterbed mattress marginal perimeter air support and method of manufacture thereof. 4,941,223, Cl. 5-452.000.
Sanyo Electric Co., Ltd.: *See*—
Hosoya, Nobukazu; Nohara, Kazunori; Ikeguchi, Yasuyuki; Sasaki, Tooru; and Hirao, Yoshichika, 4,942,314, Cl. 307-352.000.
Imaizumi, Norio, 4,942,341, Cl. 315-403.000.
Saphirwerk Industrieprodukte AG: *See*—
Bisenegger, Marcel; and Stegmann, Alain, 4,941,266, Cl. 33-556.000.
Sapia, Mark A., to Combustion Engineering, Inc. Calibration of eddy current profilometry. 4,942,545, Cl. 364-571.010.
Sardisco, Gioacchino, to FMC Corporation. Method for separation of defects from citrus juice. 4,942,051, Cl. 426-489.000.
Sarnoff, Norton; and Fletcher, Carl R., to Ensar Corporation. Microwaveable fish poacher. 4,941,401, Cl. 99-446.000.
Saro, Giancarlo, to Impianti Industriali SpA. Creel for the simultaneous changing of reels of metallic wire. 4,941,625, Cl. 242-131.000.
Sarpotdar, Pramod P.; and Strassburg, Tammy B., to Eastman Kodak. Transdermal steroid penetrant compositions and methods utilizing isopropanol and isobutanol. 4,942,158, Cl. 514-170.000.
Sarpy, John B., Jr. Plastic multi-ring paper binding system using one piece cover. 4,941,804, Cl. 412-7.000.
Sarvis Oy: *See*—
Tarna, Tauno, 4,941,586, Cl. 220-83.000.
Sasada, Shigeru, to Dainippon Screen Mfg. Co., Ltd. Rod shaped linear light diffusion apparatus. 4,941,723, Cl. 350-96.100.
Sasada, Shigeru: *See*—
Inagaki, Yukihiko; Masuda, Yoshikazu; Sasada, Shigeru; Katsuyama, Mikizo; and Tanaka, Hirohisa, 4,942,460, Cl. 358-75.000.
Sasagawa, Masaru: *See*—
Shiraishi, Motoatsu; Sasagawa, Masaru; Tazo, Ken; Kubota, Masaaki; and Katayama, Shinji, 4,941,793, Cl. 414-225.000.
Sasajima, Koji: *See*—
Koyama, Hideo; Sasajima, Koji; Maki, Kazuya; Yamaguchi, Kouji; and Ishikawa, Yoshikazu, 4,941,371, Cl. 74-865.000.
Sasaki, Hiromi; Tanaka, Tadasi; and Muneno, Yasusi, to Central Glass Company, Limited. Method for refining hydroxides of niobium and tantalum containing transition metals. 4,942,024, Cl. 423-65.000.
Sasaki, Takanobu, to Nippon Seiko Kabushiki Kaisha. Slider and anchor latch device assembly for passive seat belt system. 4,941,681, Cl. 280-804.000.
Sasaki, Takayosi: *See*—
Mori, Sanae; Sasaki, Takayosi; and Ozika, Takehiro, 4,941,269, Cl. 33-783.000.
Sasaki, Tooru: *See*—
Hosoya, Nobukazu; Nohara, Kazunori; Ikeguchi, Yasuyuki; Sasaki, Tooru; and Hirao, Yoshichika, 4,942,314, Cl. 307-352.000.
Sasaki, Toshimi: *See*—
Sobue, Masahisa; Okada, Sensuke; Akahori, Kimihiko; Kuniya, Keiichi; Sasaki, Toshimi; Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nibei, Mitsuo, 4,941,251, Cl. 29-132.000.
Sasaki, Toshio; Aoki, Masakazu; Horiguchi, Masashi; Nakagome, Yoshinobu; Ikenaga, Shinichi; and Masuhara, Toshiaki, to Hitachi, Ltd. Semiconductor memory device. 4,942,556, Cl. 365-200.000.
Sasaki, Yoshinari: *See*—
Kunugi, Takashi; and Sasaki, Yoshinari, 4,942,611, Cl. 364-474.060.
Sasakura, Masahiro: *See*—
Sumi, Kazuhiko; Hashimoto, Manabu; Sakane, Yoshikazu; Aita, Kazuo; Sasakura, Masahiro; and Ozaki, Yutaka, 4,942,618, Cl. 382-8.000.
Sasser, Gary D.: *See*—
Dody, Jospeh W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 4,942,405, Cl. 346-107.00R.
Sato, Kazuo: *See*—
Ohe, Kazuhide; Sato, Kazuo; Fukuda, Shunpei; and Nakada, Hiroyaki, 4,941,818, Cl. 431-268.000.
Sato, Keiji: *See*—
Sumi, Toyo; Miyanaka, Motoshi; Sato, Keiji; and Hayata, Yoshiki, 4,941,326, Cl. 62-180.000.
Sato, Makoto: *See*—
Umeda, Osamu; Nakakusu, Tohru; Sato, Makoto; and Shimazaki, Tatsuo, 4,941,732, Cl. 350-128.000.
Sato, Noboru: *See*—
Kojima, Tadao; Kageyama, Shunji; Okada, Minoru; Ohata, Isao; and Sato, Noboru, 4,942,242, Cl. 548-192.000.
Sato, Takehiko: *See*—
Horikoshi, Eiji; Iikawa, Tsutomu; and Sato, Takehiko, 4,941,918, Cl. 75-229.000.
Satomura, Masato: *See*—
Saeki, Keiso; Endo, Tosiaki; Satomura, Masato; and Shinozaki, Fumiaki, 4,942,107, Cl. 430-138.000.
Satou, Yasuyuki: *See*—
Karaki, Morihiro; Shinoda, Masahisa; and Satou, Yasuyuki, 4,942,584, Cl. 372-29.000.
Satterwhite, James R., to Teltest Electronics Laboratories, Inc. Synchronous phase and/or frequency detection system. 4,942,365, Cl. 328-134.000.
Sauer, Joe D.: *See*—
Laurenzo, Kathleen S.; and Sauer, Joe D., 4,942,260, Cl. 564-298.000.
Saw, Cheng K.: *See*—
Gupta, Balaram; Saw, Cheng K.; Kenny, Malcolm E.; and Harrington, Bruce A., 4,942,026, Cl. 423-326.000.
Sawada, Kenji: *See*—
Kamimura, Kuniaki; Sawada, Kenji; and Yamade, Yasushi, 4,942,425, Cl. 355-45.000.
Sayag Electronic: *See*—
Loret, Marc; Boutquet, Daniel; and Le Pen, Yannick, 4,942,392, Cl. 340-782.000.
Sayama, Yoshiaki: *See*—
Yamaguchi, Fumihiro; Sayama, Yoshiaki; and Nishida, Takao, 4,941,443, Cl. 123-376.000.
Sayles, David C., to United States of America, Army. Gas-generated expandable beads as burning rate accelerators. 4,941,931, Cl. 149-19.200.
Scamans, Geoffrey M.: *See*—
Hunter, John A.; Scamans, Geoffrey M.; and O'Callaghan, Wilfred B., 4,942,100, Cl. 429-50.000.
Schaffner, Kurt; Swozil, Adolf; and Ullmann, Gerhard, to SIGRI GmbH. Adhesive connection of tubes formed of carbon or graphite. 4,941,692, Cl. 285-114.000.
Schairer, Werner, to Telefunken electronic GmbH. Light-emitting diode of GaAsP compound semiconductive material. 4,942,439, Cl. 357-17.000.
Schajer, Gary S., to Weyerhaeuser Company. Method for estimating the strength of wood. 4,941,357, Cl. 73-600.000.
Schallner, Otto: *See*—
Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,912, Cl. 71-92.000.
Scharnhorst, Rolf: *See*—
Ortmann, Helmut; and Scharnhorst, Rolf, 4,941,244, Cl. 29-1.200.
Scheiwiller, Rolf. Elements with opening. 4,941,301, Cl. 52-102.000.
Schenker, Gilbert: *See*—
Schmid, Karl H.; Meffert, Alfred; Schenker, Gilbert; and Asbeck, Adolf, 4,942,049, Cl. 426-329.000.
Scheps, Milton H., to Smith & Nephew United, Inc. Medicated skin preparation. 4,942,029, Cl. 424-78.000.
Schewe, Hermann, to Kleemeier, Schewe & Co. KSH GmbH. Star-shaped filter nozzle. 4,941,975, Cl. 210-232.000.
Schick Laboratories, Inc.: *See*—
Frawley, Patrick J., III, 4,942,175, Cl. 514-535.000.
Schiehser, Guy A.: *See*—
Abou-Gharbia, Magid A.; Schiehser, Guy A.; and Patel, Usha R., 4,942,234, Cl. 544-332.000.
Schiller, Werner: *See*—
Herndl, Otto; and Schiller, Werner, 4,941,342, Cl. 72-402.000.
Schimbke, Paul A.: *See*—
Bartels, James I.; Seidel, Michael J.; and Schimbke, Paul A., 4,941,609, Cl. 236-78.00D.
Schimko, Philipp: *See*—
Beer, Michael; Schimko, Philipp; Hofbauer, August; and Kroner, Matthias, 4,941,436, Cl. 123-41.770.
Schipfer, Rudolf: *See*—
Paar, Willibald; Schipfer, Rudolf; and Gmoser, Johann, 4,942,196, Cl. 524-327.000.
Schlosser, Erich J., to Weber-Stephen Products Co. Ignitor housing for barbecue grill. 4,941,817, Cl. 431-263.000.
Schlunke, Jurgen, to Kleinewefers GmbH. Magazine for calender rolls. 4,941,607, Cl. 226-189.000.
Schmerbeck, Timothy J.: *See*—
Buchholtz, Timothy C.; Gruver, Michael R.; Richetta, Raymond A.; and Schmerbeck, Timothy J., 4,942,399, Cl. 341-143.000.
Schmid, Karl H.; Meffert, Alfred; Schenker, Gilbert; and Asbeck, Adolf, to Henkel Kommanditgesellschaft auf Aktien. Process for controlling foam in food processing and production. 4,942,049, Cl. 426-329.000.
Schmidt, Alain: *See*—
Bouchez, Alain; Cognard, Patrice; Marie, Gerard; and Schmidt, Alain, 4,941,749, Cl. 366-147.000.
Bouchez, Alain; Cognard, Patrice; Gearard, Marie; and Schmidt, Alain, 4,941,750, Cl. 366-147.000.
Schmidt, Donald L.: *See*—
Kau, Jee I.; Pickelman, Dale M.; Schmidt, Donald L.; and Wessling, Ritchie A., 4,941,972, Cl. 210-490.000.
Schmidt, Helmut: *See*—
Strehlow, Peter; and Schmidt, Helmut, 4,941,993, Cl. 252-315.600.
Schmidt, Robert R.: *See*—
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Durr, Manfred; Unland, Georg; Rother, Wolfgang; Driemeier, Gunter; and Schmits, Heinz-Herbert, 4,941,821, Cl. 432-106.000.
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Schuster, Richard L., to Manville Corporation. Wrap-around carrier with handle. 4,941,624, Cl. 229-117.130.
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Zedrosser, Ulrich; and Schwarz, Walter, 4,941,394, Cl. 89-129.020.
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Halavee, Uriel; Niv, Israel; and Schwarzkopf, Tzila, 4,941,980, Cl. 250-310.000.
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Scott Paper Company: *See*—
Richards, Marc F., 4,941,995, Cl. 252-407.000.
Scott, Timothy C., to Martin Marietta Energy Systems, Inc. Electric field-driven, magnetically-stabilized ferro-emulsion phase contactor. 4,941,959, Cl. 204-186.000.
Screen, Stafford T., to Colson Castors (Europe) Limited. Castor with brake mechanism. 4,941,552, Cl. 188-1.120.
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Moriarty, Ann M., 4,942,125, Cl. 435-7.000.
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Bosgiraud, Jean-Michel; and Cendre, Andre, 4,941,776, Cl. 405-224.000.
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Kitterman, Lawrence R., 4,941,592, Cl. 222-23.000.
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Searles, Robert A.: *See*—
Searles, Charles W.; Searles, Robert A.; and Searles, William S., 4,941,581, Cl. 220-1.500.
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Searles, Charles W.; Searles, Robert A.; and Searles, William S., 4,941,581, Cl. 220-1.500.
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Murakami, Kenjiro; and Uchiyama, Yukihiro, 4,941,762, Cl. 400-636.100.
Shimura, Hidetsugu; and Kurihara, Hajime, 4,942,056, Cl. 427-35.000.
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da Silva Antunes, Eloy, 4,941,555, Cl. 191-14.000.
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Stevens, Leigh H., 4,941,386, Cl. 84-410.000.
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Moehle, William E.; Rogers, John J.; and Semen, John, 4,942,145, Cl. 501-90.000.
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Seriff, Aaron J., to Shell Oil Company. Marine seismic system. 4,942,557, Cl. 367-15.000.
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Setoguchi, Tadashi: *See*—
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Seymour, Anthony. Jewelry display and servicing kiosk. 4,941,714, Cl. 312-31.000.
SFT AG Spontanfordertechnik: *See*—
Meier, Jacques, 4,941,798, Cl. 414-619.000.
SGS-Thomson Microelectronics, s.r.l.: *See*—
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Gloton, Jean-Pierre, 4,941,257, Cl. 29-840.000.
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Imbert, Michel; and Merval, Jean-Marc, 4,942,472, Cl. 358-188.000.
Shaffer, James, to Consulier Industries, Inc. Locking mechanism for fastener. 4,941,787, Cl. 411-136.000.
Shakas, Pauline V.; and Woodward, John S. Infant transitional sensory system. 4,941,453, Cl. 600-28.000.
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Kimura, Naofumi, 4,941,737, Cl. 350-335.000.
Miki, Kazumi, 4,942,138, Cl. 437-182.000.
Yoshinouchi, Atsushi; Itoh, Masataka; Tsuchimoto, Shuhei; Tarui, Keiji; and Nishigaki, Satoshi, 4,942,481, Cl. 358-471.000.
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Evans, Wayne E., 4,942,027, Cl. 423-328.000.
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Shen, Jian-Kuo: *See*—
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Shenn, Chung-Shan. Water pressure-sealing faucet without water hammer effect. 4,941,507, Cl. 137-625.370.
Shepherd, Mark R.: *See*—
Paton, Anthony D.; Temple, Stephen; and Shepherd, Mark R., 4,942,409, Cl. 346-140.00R.
Sheppard, Michael; and Hedayati, Zhian, to Anadrill, Inc. Method for improving a drilling process by characterizing the hydraulics of the drilling system. 4,941,951, Cl. 175-48.000.
Sherman, Norman; and Shiff, Victor, to Timex Corporation. Magnetic clasp for wristwatch strap. 4,941,236, Cl. 24-303.000.
Sherwood, David E., Jr.: *See*—
Dai, Pei-Shing E.; Sherwood, David E., Jr.; Bartley, Burton H.; and Petty, Randall H., 4,941,964, Cl. 208-216.0PP.
Sheu, Lai-Fa. Metal can ends with metal pull tabs bonded thereto. 4,941,328, Cl. 62-294.000.
Shiba, Keisuke; and Koya, Keizo, to Fuji Photo Film Co., Ltd. Silver halide photographic materials with reducible brightening agent releaser. 4,942,114, Cl. 430-434.000.
Shiba, Takahumi, to Pioneer Electronic Corporation. Disk reproducing method. 4,942,567, Cl. 369-124.000.
Shibata, Eiji: *See*—
Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.
Shibata, Tatsumi; Hayashi, Hideharu; Muramatsu, Yukio; and Yamamoto, Masaki, to Yazaki Corporation. Wire harness coupler instrument panels. 4,942,499, Cl. 361-428.000.
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Araki, Kazui; Kobayashi, Yoshio; Matsumoto, Seiji; and Fukushima, Hisao, 4,941,814, Cl. 425-388.000.

Shimakawa, Taiji: *See*—
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Shimamune, Takayuki: *See*—
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Shimazaki, Tatsuo: *See*—
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Shimizu, Hiroyuki: *See*—
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Shimizu, Ichio: *See*—
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Shimizu, Katsuhito: *See*—
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Shimizu, Masahiro: *See*—
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Shimizu, Tamio: *See*—
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Shimonishi, Terumi: *See*—
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Shin, Charles C.: *See*—
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Shin-Etsu Chemical Co., Ltd.: *See*—
Okamura, Yoshio; and Tanaka, Kouichi, 4,942,094, Cl. 428-447.000.

Shin-Etsu Handotai Co., Ltd.: *See*—
Ikeda, Yasuhiro, 4,942,279, Cl. 219-10.750.

Shin, Jai M.: *See*—
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Shinbo, Toshio; Yamaguchi, Tomohiko; and Tachibana, Kouzou, to Director-General of Agency of Industrial Science and Technology; and Daicel Chemical Industries. Crown ether compound and separating agent. 4,942,149, Cl. 502-401.000.

Shindo, Kazunori: *See*—
Uematsu, Ryosuke; Shindo, Kazunori; Kariya, Yoshinobu; and Oikawa, Shinro, 4,942,475, Cl. 355-256.000.

Shinkai, Ichiro: *See*—
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Shinoda, Masahisa: *See*—
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Shinohara, Junji: *See*—
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Shinohara, Toshiaki, to Mitsubishi Denki Kabushiki Kaisha. Lead frame for a semiconductor device and a method for manufacturing a semiconductor device using the lead frame. 4,942,455, Cl. 357-70.000.

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Saeki, Keiso; Endo, Tosiaki; Satomura, Masato; and Shinozaki, Fumiaki, 4,942,107, Cl. 430-138.000.

Shintani, Yooichi; Kuriyama, Kazunori; Shonai, Tohru; Kamada, Eiki; and Inoue, Kiyoshi, to Hitachi, Ltd. Data processor for concurrent executing of instructions by plural execution units. 4,942,525, Cl. 364-200.000.

Shiota, Kazuo, to Fuji Photo Film Co., Ltd. Photographic printer having a CRT for illuminating an original with a flying spot to print an image of the original. 4,942,462, Cl. 358-76.000.

Shiou-Huey, Chang: *See*—
Da-Tan, Liou; and Shiou-Huey, Chang, 4,941,549, Cl. 182-234.000.

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Shiraki, Kazuyuki: *See*—
Nagasaka, Yasuhiro; Shiga, Tsuneo; Shiraki, Kazuyuki; Maeda, Akira; Hashizawa, Shigemi; and Obtaka, Kazuto, 4,941,839, Cl. 439-352.000.

Shires, Jonathanes; and Turner, John, to Farnell Instruments Limited. Control arrangement for a switch mode power supply. 4,942,509, Cl. 363-89.000.

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Takeuchi, Shohei; Miyazawa, Kuniaki; and Ikematsu, Takenosuke, 4,941,478, Cl. 128-848.000.

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Shorthouse, Joanne: *See*—
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Ishimura, Yoshimasa; Oe, Takami; Suyama, Yuseki; and Nagato, Nobuyuki, 4,942,261, Cl. 564-480.000.

Shu, Joseph S., to Nynex Corporation. Reproduction of halftone original with moire reduction and tone adjustment. 4,942,480, Cl. 358-455.000.

Shutske, Gregory M., to Hoechst-Roussel Pharmaceuticals Inc. Method of preparing isoxazolo(5,4,3-kl)acridines. 4,942,237, Cl. 546-64.000.

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Barwig, Karlhorst; Ortkrass, Gerd; and Klimasek, Guenther, 4,941,720, Cl. 350-96.200.
Bertholdt, Horst-Otto; and Kress, Bernhard, 4,942,594, Cl. 376-310.000.
Doemens, Guenter; and Gilch, Markus, 4,941,363, Cl. 73-862.330.
Fleck, Rod; Poret, Mark; Mattheis, Karl-Heinz; Magana, Javier; and Meinhold, Christoph, 4,942,559, Cl. 368-113.000.
Kircher, Roland; and Goeltzlich, Josef, 4,942,554, Cl. 365-149.000.
Seidel, Werner; and Kandler, Walter, 4,941,248, Cl. 29-564.600.
Stoiniek, Michael, 4,942,443, Cl. 357-38.000.

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Sigman, Warren R., to United Technologies Corporation. Mirror mount with annular flat diaphragm encircling circular mirror and including a plurality of actuators. 4,941,740, Cl. 350-636.000.

Signal Processing Technologies, Inc.: *See*—
Real, Peter, 4,942,397, Cl. 341-118.000.

SIGRI GmbH: *See*—
Schaffner, Kurt; Swozil, Adolf; and Ullmann, Gerhard, 4,941,692, Cl. 285-114.000.

Sildean Limited: *See*—
Beech, Brian J.; and Beech, Edwin T., 4,941,344, Cl. 72-456.000.

Silfverstrand, Kajsa M.: *See*—
Ragnarsson, Gert A.; Silfverstrand, Kajsa M.; and Sjogren, John A., 4,942,040, Cl. 424-486.000.

Silverman, Lee A.: *See*—
Bolt, John D.; Dinh, Steven M.; and Silverman, Lee A., 4,942,011, Cl. 264-29.200.

Silvern, Lloyd W.: *See*—
Bradford, William M.; Silvern, Lloyd W.; and Dennis, Gerard A., 4,942,380, Cl. 335-301.000.

Silvestri, Claudio. Aquatic exerciser. 4,941,659, Cl. 272-62.000.

Sims, Charles. Apparatus for preventing cross threading in blind, high precision thread engagement. 4,941,789, Cl. 411-369.000.

Sinykin, William B.: *See*—
Beeley, Michael G.; Gittins, James D.; and Sinykin, William B., 4,941,275, Cl. 37-219.000.

Sivan, Richard D.; Pfiester, James R.; and Leiss, John E., to Motorola, Inc. Self-aligned trench with selective trench fill. 4,942,137, Cl. 437-63.000.

Sjoberg, Rolf G., to Aktiebolaget Electrolux. Coupling device for vacuum cleaner. 4,941,689, Cl. 285-7.000.

Sjogren, John A.: *See*—
Ragnarsson, Gert A.; Silfverstrand, Kajsa M.; and Sjogren, John A., 4,942,040, Cl. 424-486.000.

Skudrzyk, Joseph, to Packaging Concepts, Inc. Method and apparatus for forming metallized packaging material. 4,941,865, Cl. 493-22.000.

Skyline Displays, Inc.: *See*—
Beaulieu, Bryan J., 4,941,717, Cl. 312-265.300.

Slee, Earl H.: *See*—
Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., 4,941,454, Cl. 128-4.000.
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Slifkin, Malcolm, to Allegheny-Singer Research Institute. Method of extracting antigens of bacteria. 4,942,126, Cl. 435-7.000.

Slongo, Mario: *See*—
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Smillie, Charles M., III, to C.M. Smillie & Company. Power-operated lift and presenting mechanism. 4,941,797, Cl. 414-462.000.

Smit Offshore Contractors BV: *See*—
Vergouw, Theodorus C. M., 4,941,773, Cl. 405-157.000.

Smith, Benjamin A.; and Hoback, Conaway K., to Digital Telecommunications Systems, Inc. Line power control circuit for pay station telephone. 4,942,604, Cl. 379-412.000.

Smith, Edward C.: *See—*
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Smith, Edward J.: *See—*
Nowak, Thomas E.; Smith, Edward J.; and Vassilios, Eustathios, 4,941,340, Cl. 72-379.200.
Smith, Edward M.: *See—*
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Smith, Michael D.: *See—*
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Smith and Nephew Associated Companies, p.l.c.: *See—*
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Scheps, Milton H., 4,942,029, Cl. 424-78.000.
Smith, Patrick J.; Leahy, Ronald S.; and Bullock, Scott R., to Unisys Corporation. Channelized binary-level hop rate detector. 4,942,589, Cl. 375-1.000.
Smith, Ronald L.: *See—*
Moster, Robert P.; and Smith, Ronald L., 4,942,286, Cl. 219-219.000.
Smith, Rueben L.: *See—*
Wilkinson, Robert E.; Iseler, Kenneth A.; Smith, Rueben L.; Duerr, Lorenz K. E.; and Cargile, Harry M., 4,941,936, Cl. 156-274.800.
Smith, Stacy: *See—*
Wilcox, Richard C.; Allman, James; and Smith, Stacy, 4,941,545, Cl. 181-282.000.
Smith, Thomas G.; and Smith, Edward C., to T.S. Manufacturing. Sawmill carriage. 4,941,382, Cl. 83-713.000.
Smith, Thomas G., to Amoco Corporation. Process for preparation of methacrylic acid with regeneration of catalyst. 4,942,258, Cl. 562-599.000.
Smith, W. Novis, Jr. Abrasion resistant coatings. 4,942,083, Cl. 428-252.000.
Smothers, William K.: *See—*
Keys, Dalen E.; Smothers, William K.; and Harrington, Albert F., 4,942,102, Cl. 430-1.000.
Monroe, Bruce M.; and Smothers, William K., 4,942,112, Cl. 430-282.000.
Snader, Kenneth M.: *See—*
Higa, Tatsuo; and Snader, Kenneth M., 4,942,180, Cl. 514-691.000.
Snap-on Tools Corporation: *See—*
Ellingen, David R.; Michalski, Steven E.; Mieczkowski, Daniel; and Pacetti, Larry D., 4,942,356, Cl. 324-156.000.
Snow, Philip A.: *See—*
Kramer, David N.; and Snow, Philip A., 4,941,989, Cl. 252-102.000.
Snyder, George K., to General Motors Corporation. Method and apparatus for rapid repetitive cutting. 4,941,378, Cl. 83-350.000.
Snyder, Nancy W.: *See—*
Moreau, Wayne M.; Chiong, Kaolin N.; Chow, Ming-Fea; and Snyder, Nancy W., 4,942,108, Cl. 430-169.000.
Snyder, Peter A., to Harper/Love Adhesives Corporation. Starch-based corrugating adhesive containing fibers. 4,941,922, Cl. 106-214.000.
Sobel, Johannes: *See—*
Schweicher, Wolfgang; Frenken, Hans; Bussmann, Heinrich; Browatzki, Kurt; and Sobel, Johannes, 4,942,068, Cl. 427-420.000.
Sobue, Masahisa; Okada, Sensuke; Akahori, Kimihiko; Kuniya, Keiichi; Sasaki, Toshimi; Kajiwara, Toshiyuki; Kimura, Tomoaki; and Nihei, Mitsuo, to Hitachi, Ltd. Rollers for rolling mills. 4,941,251, Cl. 29-132.000.
Socha, Laura A.: *See—*
White, Dwain M.; Socha, Laura A.; and Van Der Meer, Roelof, 4,942,206, Cl. 525-397.000.
Societe anonyme dite: Compagnie Generale d'Electricite: *See—*
Godard, Bruno, 4,942,566, Cl. 369-113.000.
Societe Anonyme: Moritz: *See—*
Bouchez, Alain; Cognard, Patrice; Marie, Gerard; and Schmidt, Alain, 4,941,749, Cl. 366-147.000.
Bouchez, Alain; Cognard, Patrice; Gearard, Marie; and Schmidt, Alain, 4,941,750, Cl. 366-147.000.
Societe de Conseils de Recherches et d'Applications Scientifiques (S. C. A. S.): *See—*
Bhargava, Hridaya; and Jutteau, Jacques, 4,942,042, Cl. 424-683.000.
Societe Generale des Eaux de Vittel: *See—*
Cazes, Michel, 4,941,755, Cl. 383-119.000.
Soehnlein, Dieter; Wirths, Dieter; Knoller, Anton; and Kunert, Peter, to Hilti Aktiengesellschaft. Tool bits and method of shaping. 4,941,339, Cl. 72-189.000.
Solex: *See—*
Noisier, Guy, 4,941,999, Cl. 261-130.000.
Sollami, Phillip A. Hydraulic torque resistance device. 4,941,554, Cl. 188-310.000.
Somasundaram, Hariharan: *See—*
Fish, Aaron M.; and Somasundaram, Hariharan, 4,941,334, Cl. 70-214.000.
Sommer, Holger T., to Pacific Scientific Company. Integrating sphere aerosol particle detector. 4,942,305, Cl. 250-574.000.
Sommer, Oswin; Dorsch, Norman; Bosch, Erhard; and Kurz, Alfred, to Wacker-Chemie GmbH. Organopolysiloxane compositions which can be crosslinked to form elastomers with the elimination of alcohols. 4,942,211, Cl. 528-14.000.
Sommers, Dale C.: *See—*
Ferrari, John S.; and Sommers, Dale C., 4,942,395, Cl. 340-907.000.
Sony Corporation: *See—*
Chikuma, Takashi; and Tsutsui, Ichiro, 4,942,471, Cl. 358-165.000.
Kakinuma, Koichiro; and Watanabe, Minoru, 4,942,482, Cl. 358-474.000.
Kinoshita, Yukio, 4,942,483, Cl. 358-484.000.
Kutaragi, Ken; Tanaka, Shoji; and Fujinami, Yasushi, 4,942,486, Cl. 360-48.000.
Lagadec, Roger, 4,942,565, Cl. 369-59.000.
Osawa, Akihisa, 4,942,488, Cl. 360-80.000.
Sorenson, Richard W., to Carlingswitch, Inc. Toggle switch with self-locking feature. 4,942,272, Cl. 200-43.160.
Sosnowski, James J.: *See—*
Flexman, Edmund A.; and Sosnowski, James J., 4,942,200, Cl. 525-66.000.
Sotogoshi, Teruhito; Ishizaka, Yukio; and Nakamura, Katsunori, to Nippon Kayaku Kabushiki Kaisha. Water-insoluble black pigment. 4,941,923, Cl. 106-498.000.
Southward, James F. Underseat expansion bed vehicle for transporting long load material. 4,941,702, Cl. 296-37.600.
Space Industries Partnership, L.P.: *See—*
Ferree, Herbert E.; Andrews, Harry N.; Cooper, Frank W., Jr.; and Herberg, Joseph R., 4,941,577, Cl. 211-70.600.
Spangler, Harold L.: *See—*
Davis, Gregory A.; and Spangler, Harold L., 4,942,358, Cl. 324-158.00R.
Spanhak, F. Nicholaas: *See—*
Hainsworth, Thomas E.; Spanhak, F. Nicholaas; and Paske, Richard R., Jr., 4,942,531, Cl. 364-424.200.
Spar Aerospace Limited: *See—*
Yuan, Joseph S.; MacDonald, Richard A.; and Keung, Felix H. N., 4,942,538, Cl. 364-513.000.
Spath GmbH & Co. KG: *See—*
Spath, Walter, 4,941,338, Cl. 72-151.000.
Spath, Walter, to Spath GmbH & Co. KG. Device for cold forming of ferrous and non-ferrous metal sections. 4,941,338, Cl. 72-151.000.
Spaude, Amy L.: *See—*
Spaude, William C.; Spaude, Tod A.; and Spaude, Amy L., 4,941,693, Cl. 285-331.000.
Spaude, Tod A.: *See—*
Spaude, William C.; Spaude, Tod A.; and Spaude, Amy L., 4,941,693, Cl. 285-331.000.
Spaude, William C.; Spaude, Tod A.; and Spaude, Amy L., to Spiral Specialties, Inc. Connector for air ducts. 4,941,693, Cl. 285-331.000.
Speakman, Warner E.: *See—*
Addy, Timothy E.; and Speakman, Warner E., 4,942,275, Cl. 200-308.000.
Specht, Brian; and Ippolito, Robert, to Cycle Products Company. Bicycle handle grip assembly. 4,941,369, Cl. 74-551.900.
Specialised Conductives Pty. Limited: *See—*
MacFarlane, Douglas R.; Philpott, Arthur K.; and Tetaz, John R., 4,942,501, Cl. 361-523.000.
Spectra-Physics: *See—*
Kintz, Gregory J.; Baer, Thomas M.; and Kafka, James D., 4,942,582, Cl. 372-18.000.
Spectramed, Inc.: *See—*
Williams, Wilbur R.; Bornzin, Gene A.; and Thompson, John S., 4,941,475, Cl. 128-692.000.
Spencer, Robert M.: *See—*
Williams, Harold R.; and Spencer, Robert M., 4,941,518, Cl. 141-1.000.
Spinner GmbH, Elektrotechnische Fabrik: *See—*
Pautz, Anton; and Lang, Manfred, 4,941,728, Cl. 350-96.210.
Spira Patententwicklungs-und Beteiligungsgesellschaft mbH: *See—*
Brunner, Heinz; and Pschellok, Waldemar, 4,941,605, Cl. 226-97.000.
Spiral Specialties, Inc.: *See—*
Spaude, William C.; Spaude, Tod A.; and Spaude, Amy L., 4,941,693, Cl. 285-331.000.
Spitaler, Ulrich: *See—*
Riede, Urs N.; and Spitaler, Ulrich, 4,942,181, Cl. 514-730.000.
Sport Maska Inc.: *See—*
Cournoyer, Andre; Berard, Serge; and Cote, Denis, 4,941,331, Cl. 66-25.000.
Sproesser, Linhard: *See—*
Buschmann, Ernst; Sproesser, Linhard; Zeeh, Bernd; Jung, Johann; Rademacher, Wilhelm; Ammermann, Eberhard; and Pommer, Ernst-Heinrich, 4,942,244, Cl. 548-268.200.
SPS Technologies, Inc.: *See—*
Tambini, Angelo, 4,941,362, Cl. 73-862.230.
Srba, Craig F. Multi-torch interface assembly for inert gas welding. 4,942,281, Cl. 219-75.000.
SS Pharmaceutical Co., Ltd.: *See—*
Nakazawa, Hitoshi; Ohtsuka, Mari; Matsuda, Hideaki; Katori, Tatsuhiko; and Irinoda, Kazuhiko, 4,942,172, Cl. 514-441.000.
Stacker Machine Co., Inc.: *See—*
Raybuck, William, 4,941,650, Cl. 270-95.000.
Stahlwerke Bochum AG: *See—*
Domes, Heribert, 4,942,061, Cl. 427-104.000.

Stamm, Klaus: *See*—
Heuel, Wolfgang; Meyer Zu Bexten, Jobst H.; Muller, Rainer; and Stamm, Klaus, 4,942,080, Cl. 428-212.000.
Stamnitz, Timothy C.: *See*—
Russell, Stephen D.; and Stamnitz, Timothy C., 4,941,726, Cl. 350-96.150.
Stancato, Joe L. Method and apparatus for straightening vehicle bodies and frames. 4,941,343, Cl. 72-447.000.
Starck, Roland: *See*—
Roller, Hanno; and Starck, Roland, 4,942,289, Cl. 219-504.000.
Starkey, David T.: *See*—
Williams, Anthony G.; and Starkey, David T., 4,941,387, Cl. 84-609.000.
Staudinger, Gernot: *See*—
Freimann, Paul; and Staudinger, Gernot, 4,941,890, Cl. 48-197.00R.
Steckler, Edward T. Lock mechanism. 4,941,336, Cl. 70-365.000.
Steece, William H.: *See*—
Elliott, William A.; Greene, Richard A.; Kennedy, Robert P.; Poe, Robert P., Jr.; and Steece, William H., 4,941,795, Cl. 414-403.000.
Steel, Francis R., deceased: *See*—
Leitch, Clifford D.; and Steel, Francis R., deceased, 4,942,592, Cl. 375-90.000.
Steel, Lynne A., legal representative: *See*—
Leitch, Clifford D.; and Steel, Francis R., deceased, 4,942,592, Cl. 375-90.000.
Stegmann, Alain: *See*—
Bissegger, Marcel; and Stegmann, Alain, 4,941,266, Cl. 33-556.000.
Stein, Andreas: *See*—
Ozin, Geoffrey A.; Godber, John; and Stein, Andreas, 4,942,119, Cl. 430-564.000.
Steinbock, Heinz. Excavator. 4,941,786, Cl. 414-695.700.
Steinwandel, Juergen; Hauser, Manfred; and Hoeschele, Joerg, to Dornier System GmbH. Making an amorphous layer. 4,942,057, Cl. 427-38.000.
Stelts, Philip D.; Kern, David W.; and Fioravanti, Kenneth J., to Bethlehem Steel Corporation; and Air Products & Chemicals, Inc. Air cooled gas injection lance. 4,941,646, Cl. 266-270.000.
Sterling Drug Inc.: *See*—
Diana, Guy D.; and Bailey, Thomas R., 4,942,241, Cl. 548-131.000.
Stern, Philip A.: *See*—
Mort, Thomas W.; Stern, Philip A.; and Garner, Scott W., 4,942,432, Cl. 355-260.000.
Sterner, James G., Jr. Combination newspaper and trash receptacle. 4,941,653, Cl. 220-1.00T.
Sterns, William G., to ITT Corporation. Tubular microwave phase shifter. 4,942,376, Cl. 333-160.000.
Stevens, Eric G., to Eastman Kodak Company. Integrated-circuit having two NMOS depletion mode transistors for producing stable DC voltage. 4,942,312, Cl. 307-296.800.
Stevens, Leigh H., to Selmer Company, The. Resonator tuning adjustment for keyboard percussion instruments. 4,941,386, Cl. 84-410.000.
Stewart, G. Wayne; Davis, Bill E.; Thomas, William M.; Dobie, Michael J.; and Bacigalupe, Carlos, to Stewart Systems, Inc. Air circulation and exhaust control system for commercial ovens. 4,941,819, Cl. 432-8.000.
Stewart Stamping Corp.: *See*—
Philippson, Walter M.; Brennan, Robert J.; and Meighen, Terrence, 4,941,848, Cl. 439-607.000.
Stewart Systems, Inc.: *See*—
Stewart, G. Wayne; Davis, Bill E.; Thomas, William M.; Dobie, Michael J.; and Bacigalupe, Carlos, 4,941,819, Cl. 432-8.000.
Steyr-Daimler-Puch AG: *See*—
Zedrosser, Ulrich; and Schwarz, Walter, 4,941,394, Cl. 89-129.020.
Stiffler, Stephen P., to Kennametal Inc. Cemented carbide tip. 4,941,711, Cl. 299-79.000.
Stoisiek, Michael, to Siemens Aktiengesellschaft. Thyristor with auxiliary emitter electrode and short-circuit regions and method. 4,942,443, Cl. 357-38.000.
Stoll, Josef: *See*—
Reiner, Klaus; Rieker, Heinz; and Stoll, Josef, 4,941,365, Cl. 73-865.000.
Stoll, Kurt; and Glattli, Hans H. Mold construction comprising a plurality of mold portions. 4,941,642, Cl. 249-122.000.
Stoller, David. Parking space barrier. 4,941,284, Cl. 49-49.000.
Storek, Josef: *See*—
Janos, Frantisek; Storek, Josef; and Krepelka, Ladislav, 4,941,274, Cl. 36-117.000.
Storey, Richard: *See*—
Sandbank, Charles P.; Childs, Ian; and Storey, Richard, 4,942,466, Cl. 358-133.000.
Stout, Donald E.: *See*—
McIntosh, Kenneth B.; Pratt, James O.; and Stout, Donald E., 4,942,544, Cl. 364-569.000.
Stowell, William J.: *See*—
Pollock, Mark A.; Stowell, William J.; and Krutak, James J., 4,942,005, Cl. 264-45.300.
Strader, Robert C.: *See*—
Merrill, Richard A.; Crockett, Bruce L.; and Strader, Robert C., 4,942,552, Cl. 364-900.000.
Strang, Harry: *See*—
Kirsten, Rolf; Kluth, Joachim; Fest, Christa; Gesing, Ernst; Muller, Klaus-Helmut; Riebel, Hans-Jochem; Babczinski, Peter; Schallner, Otto; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,912, Cl. 71-92.000.
Muller, Klaus-Helmut; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,910, Cl. 71-92.000.
Strassburg, Tammy B.: *See*—
Sarpotdar, Pramod P.; and Strassburg, Tammy B., 4,942,158, Cl. 514-170.000.
Strauss, Paul: *See*—
Adler, Robert; Coult, John H.; and Strauss, Paul, 4,942,332, Cl. 313-402.000.
Strehlow, Peter; and Schmidt, Helmut, to Fraunhofer-Gesellschaft zur Forderung der angewandten Forschung e.V. Process for the production of condensation products which can be converted into glass. 4,941,993, Cl. 252-315.600.
Strepparola, Ezio; Alfieri, Mario; and Gavezotti, Piero, to Ausimont S.p.A. Lubricating greases. 4,941,987, Cl. 252-58.000.
Stroze, Mark S.: *See*—
Reynolds, Richard W.; and Stroze, Mark S., 4,941,395, Cl. 92-57.000.
Stuart, Paul O., to Eastman Kodak Company. Fixing method and apparatus. 4,942,433, Cl. 355-284.000.
Stueben, Helmut: *See*—
Baymak, Faruk; and Stueben, Helmut, 4,941,710, Cl. 297-471.000.
Suematsu, Chiaki: *See*—
Ichimura, Kiyoshi; Ito, Kideaki; Fuse, Masaki; Suematsu, Chiaki; Suzuki, Shingo; and Takahashi, Satoshi, 4,942,292, Cl. 250-203.400.
Suffness, Mathew: *See*—
Haugwitz, Rudiger D.; Zalkow, Leon; Glinski, Jan; Suffness, Mathew; Deutsch, Howard M.; and Narayanan, Venkatachala, 4,942,184, Cl. 514-449.000.
Sugano, Akira: *See*—
Miyagaki, Hisanori; Shimizu, Katsuhito; Tobita, Haruya; Takita, Atsushi; Kimura, Tooru; Sugano, Akira; Kikuchi, Masayuki; and Fukai, Masayuki, 4,942,514, Cl. 364-190.000.
Suganuma, Noriyuki. Golf club, set of golf clubs, and method of producing the same. 4,941,666, Cl. 273-169.000.
Sugarman, Louis; and Dressler, Max B., to Alcraft, Inc. Holder for a tape marker flag dispenser and the like. 4,941,576, Cl. 211-13.000.
Sugimoto, Hachiro; Nakamura, Takaharu; Tsuchiya, Yutaka; Sugumi, Hiroyuki; Higurashi, Kunizou; Karibe, Norio; Yamanishi, Yoshiharu; Ogura, Hiroo; Araki, Shin; Kubota, Atsuhiko; Ohtake, Michiko; and Tamatsu, Kiyomi, to Eisai Co., Ltd. Piperidine derivative and pharmaceutical composition. 4,942,169, Cl. 514-318.000.
Sugimura, Hideo: *See*—
Nasu, Yasunobu; Ogishima, Taichi; Dei, Akira; Uchida, Haruhiko; Inami, Mitsuru; Furuhashi, Tatsuo; Hino, Yasuhiko; and Sugimura, Hideo, 4,942,048, Cl. 426-271.000.
Sugioka, Takao: *See*—
Ogawa, Souichi; Sugioka, Takao; and Inoue, Masaru, 4,942,379, Cl. 335-301.000.
Sugita, Kyoko: *See*—
Arai, Shigeyoshi; Sugita, Kyoko; Isomura, Shohei; and Kaetsu, Hayato, 4,941,956, Cl. 204-157.200.
Sugiura, Toshio: *See*—
Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.
Sugiyama, Shuji, to Hitachi, Ltd. Projection aligner for fabricating semiconductor device having projection optics. 4,941,745, Cl. 356-401.000.
Sugiyama, Toshiki: *See*—
Suzuki, Yasushi; Takahara, Yasuo; Masui, Atusi; Ohahima, Toshihiro; Takeuchi, Fumihiro; Sugiyama, Toshiki; and Setoguchi, Tadashi, 4,941,437, Cl. 123-41.120.
Sugumi, Hiroyuki: *See*—
Sugimoto, Hachiro; Nakamura, Takaharu; Tsuchiya, Yutaka; Sugumi, Hiroyuki; Higurashi, Kunizou; Karibe, Norio; Yamanishi, Yoshiharu; Ogura, Hiroo; Araki, Shin; Kubota, Atsuhiko; Ohtake, Michiko; and Tamatsu, Kiyomi, 4,942,169, Cl. 514-318.000.
Sullivan, William P.: *See*—
Dody, Jospeh W.; Klinke, Richard J.; Lowery, Christopher A.; Vallentin-Price, Vera D.; Sasser, Gary D.; and Sullivan, William P., 4,942,405, Cl. 346-107.00R.
Sumi, Kazuhiko; Hashimoto, Manabu; Sakaue, Yoshikazu; Aita, Kazuo; Sasakura, Masahiro; and Ozaki, Yutaka, to Mitsubishi Denki Kabushiki Kaisha. Method and apparatus for determining the shape of wire or like article. 4,942,618, Cl. 382-8.000.
Sumi, Toyo; Miyanaka, Motoshi; Sato, Keiji; and Hayata, Yoshiki, to Hitachi, Ltd. Air conditioner having outdoor air introducing mechanism. 4,941,326, Cl. 62-180.000.
Sumitomo Chemical Company Limited: *See*—
Takao, Hiroyoshi; Inoue, Yoshio; and Yamazaki, Hirotami, 4,942,223, Cl. 528-501.000.
Sumitomo Electric Industries Ltd.: *See*—
Itozaki, Hideo; Tanaka, Saburo; Fujita, Nobuhiko; Yazu, Shuji; and Jodai, Tetsuji, 4,942,142, Cl. 505-1.000.
Itozaki, Hideo; Harada, Keizo; and Yazu, Shuji, 4,942,152, Cl. 505-1.000.
Takahashi, Nobuhiro, 4,941,780, Cl. 407-114.000.
Sumitomo Special Metals, Co., Ltd.: *See*—
Hamamura, Atsushi; Hamada, Takaki; Nakamura, Hiroko; Imai, Tomoyuki; Matsui, Toshiki; and Horiishi, Nanao, 4,942,098, Cl. 428-555.000.

Sun-Chueh, Kao: *See*—
Karol, Frederick J.; Sun-Chueh, Kao; and Drage, James S., 4,942,147, Cl. 502-113.000.
Sunaga, Kiyomi: *See*—
Yamasaki, Masahiko; Sunaga, Kiyomi; and Nagai, Yoshitaka, 4,942,131, Cl. 435-240.270.
Sunbeam Plastics Corporation: *See*—
Julian, Randall K., 4,941,580, Cl. 215-235.000.
Julian, Randall K., 4,941,815, Cl. 425-525.000.
Sundstrand Corporation: *See*—
Crowe, Lawrence E., 4,941,530, Cl. 165-104.330.
Reynolds, Richard W.; and Stroze, Mark S., 4,941,395, Cl. 92-57.000.
Rozman, Gregory I.; and Baits, Paul G., 4,942,493, Cl. 361-23.000.
Surgical Engineering Associates, Inc.: *See*—
Moden, James R.; Caldwell, Michael D.; and Moden, Robert D., 4,941,472, Cl. 128-419.0PS.
Sussman, Harold I. Device for cleaning dental implant posts. 4,941,227, Cl. 15-167.100.
Sutton, Richard C.: *See*—
Reithel, Raymond F.; and Sutton, Richard C., 4,942,103, Cl. 430-7.000.
Suyama, Yuseki: *See*—
Ishimura, Yoshimasa; Oe, Takami; Suyama, Yuseki; and Nagato, Nobuyuki, 4,942,261, Cl. 564-480.000.
Suzuki, Hidetaka: *See*—
Yokoyama, Masaharu; Ogino, Koichi; and Suzuki, Hidetaka, 4,942,534, Cl. 364-468.000.
Suzuki Jidosha Kogyo Kabushiki Kaisha: *See*—
Anderson, Ron L., 4,941,421, Cl. 114-144.00R.
Kawai, Makoto; Nakamura, Kazuhito; and Kageyama, Minoru, 4,941,397, Cl. 92-223.000.
Suzuki, Jun, to Pioneer Electronic Corporation. Pickup actuator for disk-type media. 4,942,562, Cl. 369-44.110.
Suzuki, Katsumi: *See*—
Suzuki, Mamoru; Suzuki, Katsumi; Itoh, Kazutoshi; Minato, Akira; Kambayashi, Tsuyoshi; and Hoshino, Yoshiyuki, 4,941,973, Cl. 210-175.000.
Suzuki, Kenji: *See*—
Koishi, Musubu; Tsuchiya, Yutaka; Hara, Tomoyoshi; and Suzuki, Kenji, 4,942,293, Cl. 250-213.0VT.
Suzuki, Makoto, to Brother Kogyo Kabushiki Kaisha. Optically pumped solid-state laser oscillator. 4,942,587, Cl. 372-71.000.
Suzuki, Makoto: *See*—
Higuchi, Hisayuki; Suzuki, Makoto; Homma, Noriyuki; and Itoh, Kiyoo, 4,942,555, Cl. 365-189.070.
Suzuki, Mamoru; Suzuki, Katsumi; Itoh, Kazutoshi; Minato, Akira; Kambayashi, Tsuyoshi; and Hoshino, Yoshiyuki, to Hitachi, Ltd. Apparatus for removing iron oxides from water in feed water system of a power plant. 4,941,973, Cl. 210-175.000.
Suzuki, Masashi: *See*—
Shimizu, Tomoyuki; Taniguchi, Yoshikazu; Higuchi, Motohiro; and Suzuki, Masashi, 4,941,608, Cl. 236-12.120.
Suzuki, Osamu; Ishiwata, Syousuke; Hayashi, Mitsuroh; and Oshima, Hideaki, to Chichibu Cement Kabushiki Kaisha. Vibration-type rheometer apparatus. 4,941,346, Cl. 73-54.000.
Suzuki, Osamu; and Ishida, Noboru, to NGK Spark Plug Co., Ltd. Ball bearing type turbocharger rotor assembly. 4,941,760, Cl. 384-537.000.
Suzuki, Shigeaki: *See*—
Mori, Toshiki; Suzuki, Shigeaki; and Onishi, Takashi, 4,942,262, Cl. 568-32.000.
Suzuki, Shigeru: *See*—
Mashiko, Harumitsu; Suzuki, Shigeru; and Seto, Takashi, 4,942,422, Cl. 355-28.000.
Suzuki, Shingo: *See*—
Ichimura, Kiyoshi; Ito, Kideaki; Fuse, Masaki; Suematsu, Chiaki; Suzuki, Shingo; and Takahashi, Satoshi, 4,942,292, Cl. 250-203.400.
Suzuki, Shoji, to Canon Kabushiki Kaisha. Communication apparatus for generating a call signal from a telephone set to a data terminal. 4,942,600, Cl. 379-100.000.
Suzuki, Takaya: *See*—
Konishi, Nobutake; Hosokawa, Yoshikazu; Mimura, Akio; Suzuki, Takaya; Ohwada, Jun-ichi; Kawakami, Hideaki; and Miyata, Kenji, 4,942,441, Cl. 357-23.700.
Suzuki, Toshifumi: *See*—
Tachibana, Yakudo; Tate, Kazuhiko; Suzuki, Toshifumi; and Chiba, Kouji, 4,942,257, Cl. 562-481.000.
Suzuki, Toshihiro; and Komatsu, Chizu, to Ihara Chemical Industry Co., Ltd. Process for producing a halobenzene. 4,942,268, Cl. 570-206.000.
Suzuki, Tsuyoshi: *See*—
Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.
Suzuki, Yasushi; Takahara, Yasuo; Masui, Atusi; Ohshima, Toshihiro; Takeuchi, Fumihiro; Sugiyama, Toshiki; and Setoguchi, Tadashi, to Nippondenso Co., Ltd.; and Toyota Jidosha Kabushiki Kaisha. Automotive radiator cooling system. 4,941,437, Cl. 123-41.120.
Suzuki, Yasuyuki: *See*—
Ishikawa, Keiichi; Tsuchiyama, Tadashi; Suzuki, Yasuyuki; and Hasegawa, Hiroaki, 4,941,559, Cl. 192-107.00R.
Suzuki, Yoshio: *See*—
Iio, Masahiro; Suzuki, Yoshio; Takayama, Hidehiko; and Sakamoto, Katsumi, 4,941,810, Cl. 418-15.000.
Swan, Michael D.: *See*—
Bowden, Wesley E.; and Swan, Michael D., 4,941,844, Cl. 439-425.000.
Swanson, Murray S.: *See*—
Misch, Donald W.; Hagadorn, Irvine R., deceased; Higgins, Thomas D., III, legal representative; Darby, William M.; and Swanson, Murray S., 4,941,631, Cl. 248-178.000.
Swanson, Sandra G. Fishing lure. 4,941,279, Cl. 43-42.220.
Sweers, Ronald L. Guard screen for a rain gutter. 4,941,299, Cl. 52-12.000.
Swift, Arthur L., IV: *See*—
Pickett, Scott K.; Luich, Thomas M.; and Swift, Arthur L., IV, 4,942,319, Cl. 307-465.000.
Swozil, Adolf: *See*—
Schaffner, Kurt; Swozil, Adolf; and Ullmann, Gerhard, 4,941,692, Cl. 285-114.000.
Szyszko, Bernard R.: *See*—
Kerr, E. Michael; and Szyszko, Bernard R., 4,941,925, Cl. 134-3.000.
T. A. Pelsue Company: *See*—
Pelsue, Bradley A.; and Niksic, Mark R., 4,941,499, Cl. 135-104.000.
T.S. Manufacturing: *See*—
Smith, Thomas G.; and Smith, Edward C., 4,941,382, Cl. 83-713.000.
Tabak, Samuel A.: *See*—
Garwood, William E.; Krambeck, Frederick J.; Kushnerick, John D.; and Tabak, Samuel A., 4,942,021, Cl. 422-194.000.
Tabata, Hiroshi; Nakao, Shizuyo; Kinoshita, Yoshihiko; and Katsuki, Atsushi, to Honda Giken Kogyo Kabushiki Kaisha. Vehicle seat belt tightening system. 4,941,683, Cl. 280-807.000.
Tabata, Hiroshi: *See*—
Toyoda, Shigeaki; Watanabe, Shunnosuke; and Tabata, Hiroshi, 4,942,178, Cl. 514-617.000.
Tabor, Stanley; and Richardson, Charles C., to President & Fellows of Harvard College. T7 DNA polymerase. 4,942,130, Cl. 435-194.000.
Tachibana, Kouzou: *See*—
Shinbo, Toshio; Yamaguchi, Tomohiko; and Tachibana, Kouzou, 4,942,149, Cl. 502-401.000.
Tachibana, Yakudo; Tate, Kazuhiko; Suzuki, Toshifumi; and Chiba, Kouji, to NKK Corporation. Method of manufacturing alkali metal salt of 2,3,6,7-naphthalenetetracarboxylic acid. 4,942,257, Cl. 562-481.000.
Tada, Tatsuya, to Canon Kabushiki Kaisha. Image forming apparatus. 4,942,431, Cl. 355-246.000.
Tadokoro, Hiroyuki, to Hitachi, Ltd. Scanning type image recording apparatus. 4,942,407, Cl. 346-108.000.
Tagiri, Sumiho: *See*—
Hara, Yoshimasa; Ohkura, Seisaku; Iijima, Fumio; Tamura, Isamu; Fukai, Tetsuro; Tagiri, Sumiho; and Takagi, Norimasa, 4,941,794, Cl. 414-341.000.
Taguchi, Shunichi: *See*—
Hisada, Takanori; Maruyama, Takesuke; Deguchi, Masaharu; Noro, Yoshihiko; Honma, Yoshifumi; Ariki, Yoshio; and Taguchi, Shunichi, 4,941,719, Cl. 350-6.800.
Taheri, Syde A. Method for aiding cardiocepital venous flow from the foot and leg of an ambulatory patient. 4,941,458, Cl. 128-64.000.
Taiho Kogyo Co., Ltd.: *See*—
Asada, Eiji; Tomikawa, Takashi; and Fukuoka, Tatsuhiko, 4,941,919, Cl. 75-235.000.
Taipale, Seppo, to Tamfeld Oy Ab. Multi-weft paper machine cloth with intermediate layer selected to control permeability. 4,941,514, Cl. 139-383.00A.
Takabayashi, Seiichirou; and Egami, Masaki, to Ube Industries, Ltd.; and NTN-Rulon Industries, Ltd. Extruded porous articles of polyimide and continuous preparation of the same. 4,942,092, Cl. 428-401.000.
Takada, Koichi: *See*—
Kobayashi, Shinji; Takada, Koichi; Watanabe, Kazuo; and Mitsuse, Motoharu, 4,942,385, Cl. 340-556.000.
Takada, Mitsuyuki: *See*—
Ootsuki, Hideaki; Takada, Mitsuyuki; Kokogawa, Toru; and Takasago, Hayato, 4,942,140, Cl. 437-211.000.
Takada, Toshimichi: *See*—
Noguchi, Toru; Takada, Toshimichi; Yonezaki, Takahiro; Yamaguchi, Yoshio; Kakiuchi, Hajime; Deki, Shigehito; Goto, Kazuo; Miyata, Hitoshi; and Mashimo, Satoshi, 4,941,961, Cl. 204-294.000.
Takagi, Makoto; Fujii, Norio; and Fujimori, Yoshihiko, to Nikon Corporation. Pattern inspecting apparatus. 4,942,619, Cl. 382-47.000.
Takagi, Norimasa: *See*—
Hara, Yoshimasa; Ohkura, Seisaku; Iijima, Fumio; Tamura, Isamu; Fukai, Tetsuro; Tagiri, Sumiho; and Takagi, Norimasa, 4,941,794, Cl. 414-341.000.
Takagi, Osamu: *See*—
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Takahara, Yasuo: *See*—
Suzuki, Yasushi; Takahara, Yasuo; Masui, Atusi; Ohshima, Toshihiro; Takeuchi, Fumihiro; Sugiyama, Toshiki; and Setoguchi, Tadashi, 4,941,437, Cl. 123-41.120.
Takahashi, Hideharu; and Uchida, Yoshiaki, to Sanshin Kogyo Kabushiki Kaisha. Boarding sensor and controller for small watercraft. 4,941,854, Cl. 440-1.000.

Takahashi, Hiroyuki: *See*—
Isobe, Kenji; Hori, Michio; Yoshizawa, Hiroyasu; Ogawa, Kazuo; Takahashi, Hiroyuki; Noguchi, Mitsuo; and Maeda, Toshio, 4,942,099, Cl. 429-35.000.

Takahashi, Kenji: *See*—
Mori, Nobufumi; Hosoi, Yuichi; and Takahashi, Kenji, 4,942,300, Cl. 250-327.200.

Takahashi, Nobuhiro, to Sumitomo Electric Industries, Ltd. Indexable cutting insert. 4,941,780, Cl. 407-114.000.

Takahashi, Norimichi; Tanaka, Hitoshi; and Maruyama, Koichi, to Asahi Kogaku Kogyo Kabushiki Kaisha. Front conversion adapter for lens shutter type of zoom lens camera. 4,942,414, Cl. 354-195.120.

Takahashi, Satoji; and Takemoto, Tadashi, to Ajinomoto Co., Inc. Method for producing α-aspartylphenylalanine derivatives. 4,942,255, Cl. 560-41.000.

Takahashi, Satoshi: *See*—
Ichimura, Kiyoshi; Ito, Kideaki; Fuse, Masaki; Suematsu, Chiaki; Suzuki, Shingo; and Takahashi, Satoshi, 4,942,292, Cl. 250-203.400.

Takai, Hideyuki; and Kanemaru, Tetsuro, to Canon Kabushiki Kaisha. Electrophotographic photosensitive member containing disazo pigment having coupler residue. 4,942,106, Cl. 430-72.000.

Takakura, Yoshinari, to Aisin Seiki Kabushiki Kaisha. Double water pump device. 4,941,801, Cl. 415-170.100.

Takao, Hiroyoshi; Inoue, Yoshio; and Yamazaki, Hirotami, to Sumitomo Chemical Company Limited. Process for separating a polymer from a solution containing the same. 4,942,223, Cl. 528-501.000.

Takao, Itaru: *See*—
Koike, Hisashi; Takao, Itaru; Narushima, Masaki; and Takekoshi, Kiyoshi, 4,941,800, Cl. 414-752.000.

Takasago, Hayato: *See*—
Ootsuki, Hideaki; Takada, Mitsuyuki; Kokogawa, Toru; and Takasago, Hayato, 4,942,140, Cl. 437-211.000.

Takase, Minoru; Ueno, Naoya; and Arashi, Toshimi, to Idemitsu Petrochemical Company Limited. Plastic optical transmittable fibers. 4,941,730, Cl. 350-96.340.

Takashima, Masaaki: *See*—
Zama, Yoshiaki; Umeda, Itsuki; Takemura, Yasuhiko; Takashima, Masaaki; Funabashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Yoshida, Hiromichi, 4,942,202, Cl. 525-104.000.

Takata, Danzaburo. Humidification face mask. 4,941,467, Cl. 128-203.120.

Takayama, Hidehiko: *See*—
Iio, Masahiro; Suzuki, Yoshio; Takayama, Hidehiko; and Sakamoto, Katsumi, 4,941,810, Cl. 418-15.000.

Takayama, Kazuo; and Fuse, Hidefumi, to Fujitsu Ten Limited; and Toyota Jidosha Kabushiki Kaisha. Mobile radio-receiver system with improved reproduction characteristics of reception signal having noise superimposed thereon. 4,942,622, Cl. 455-278.000.

Takayama, Makoto: *See*—
Yamagishi, Yoichi; and Takayama, Makoto, 4,942,478, Cl. 358-409.000.

Takeda Chemical Industries, Ltd.: *See*—
Kishimoto, Shoji; Tomimatsu, Kiminori; and Miyake, Akio, 4,942,159, Cl. 514-202.000.

Takeda, Kiyoshi: *See*—
Zama, Yoshiaki; Umeda, Itsuki; Takemura, Yasuhiko; Takashima, Masaaki; Funabashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Yoshida, Hiromichi, 4,942,202, Cl. 525-104.000.

Takekoshi, Kiyoshi: *See*—
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Takemoto, Tadashi: *See*—
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Takemoto, Yoshitaka: *See*—
Mori, Ryuichiro; Fukudome, Katsuyuki; Akiyama, Tatsuhiko; and Takemoto, Yoshitaka, 4,942,454, Cl. 357-70.000.

Takemura, Yasuhiko: *See*—
Zama, Yoshiaki; Umeda, Itsuki; Takemura, Yasuhiko; Takashima, Masaaki; Funabashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Yoshida, Hiromichi, 4,942,202, Cl. 525-104.000.

Takeuchi, Fumihiro: *See*—
Suzuki, Yasushi; Takahara, Yasuo; Masui, Atusi; Ohshima, Toshihiro; Takeuchi, Fumihiro; Sugiyama, Toshiki; and Setoguchi, Tadashi, 4,941,437, Cl. 123-41.120.

Takeuchi, Hokuto: *See*—
Boda, Keiji; Waki, Kouichirou; Niide, Kazuo; Yokota, Hiroaki; Yanagisawa, Keizo; and Takeuchi, Hokuto, 4,942,530, Cl. 364-424.100.

Takeuchi, Shohei; Miyazawa, Kuniaki; and Ikematsu, Takenosuke, to Shohei Takeuchi. Pillow for controlling snoring. 4,941,478, Cl. 128-848.000.

Takimoto, Kazuyuki: *See*—
Motooka, Masanori; Takimoto, Kazuyuki; and Fukui, Kunisuke, 4,942,087, Cl. 428-332.000.

Takita, Atsushi: *See*—
Miyagaki, Hisanori; Shimizu, Katsuhito; Tobita, Haruya; Takita, Atsushi; Kimura, Tooru; Sugano, Akira; Kikuchi, Masayuki; and Fukai, Masayuki, 4,942,514, Cl. 364-190.000.

Tamaki, Reiji; and Harada, Shigeru, to Mitsubishi Denki Kabushiki Kaisha. Semiconductor device having improved antireflection coating. 4,942,451, Cl. 357-67.000.

Tamatsu, Kiyomi: *See*—
Sugimoto, Hachiro; Nakamura, Takaharu; Tsuchiya, Yutaka; Sugumi, Hiroyuki; Higurashi, Kunizou; Karibe, Norio; Yamanishi, Yoshiharu; Ogura, Hiroo; Araki, Shin; Kubota, Atsuhiko; Obtake, Michiko; and Tamatsu, Kiyomi, 4,942,169, Cl. 514-318.000.

Tambini, Angelo, to SPS Technologies, Inc. Torque and angular displacement sensing in controlled wrenches. 4,941,362, Cl. 73-862.230.

Tamfelt Oy Ab: *See*—
Taipale, Seppo, 4,941,514, Cl. 139-383.00A.

Tamitani, Ichiro: *See*—
Nishitani, Takao; and Tamitani, Ichiro, 4,942,470, Cl. 358-160.000.

Tamura, Itamu: *See*—
Hara, Yoshimasa; Ohkura, Seisaku; Iijima, Fumio; Tamura, Itamu; Fukai, Tetsuro; Tagiri, Sumiho; and Takagi, Norimasa, 4,941,794, Cl. 414-341.000.

Tanaka, Hirohisa: *See*—
Inagaki, Yukihiko; Masuda, Yoshikazu; Sasada, Shigeru; Katsuyama, Mikizo; and Tanaka, Hirohisa, 4,942,460, Cl. 358-75.000.

Tanaka, Hitoshi: *See*—
Takahashi, Norimichi; Tanaka, Hitoshi; and Maruyama, Koichi, 4,942,414, Cl. 354-195.120.

Tanaka, Kouichi: *See*—
Okamura, Yoshio; and Tanaka, Kouichi, 4,942,094, Cl. 428-447.000.

Tanaka, Masaaki: *See*—
Yasui, Koji; Tanaka, Masaaki; and Kuzumoto, Masaki, 4,942,588, Cl. 372-103.000.

Tanaka, Norio; Kakuta, Takuya; Oya, Eiichi; and Baba, Masatoshi, to Nissan Chemical Industries Ltd. Process for producing 4-benzoyl-5-hydroxypyrazoles. 4,942,246, Cl. 548-367.000.

Tanaka, Saburo: *See*—
Itozaki, Hideo; Tanaka, Saburo; Fujita, Nobuhiko; Yazu, Shuji; and Jodai, Tetsuji, 4,942,142, Cl. 505-1.000.

Tanaka, Shoji: *See*—
Kutaragi, Ken; Tanaka, Shoji; and Fujinami, Yasushi, 4,942,486, Cl. 360-48.000.

Tanaka, Tadasi: *See*—
Sasaki, Hiromi; Tanaka, Tadasi; and Muneno, Yasusi, 4,942,024, Cl. 423-65.000.

Tanaka, Takeshi: *See*—
Nakashima, Terumi; and Tanaka, Takeshi, 4,941,842, Cl. 439-399.000.

Tanaka, Toshiharu: *See*—
Usami, Toshimasa; Tanaka, Toshiharu; and Kiritani, Masataka, 4,942,150, Cl. 503-213.000.

Tanaka, Yasunori; Kobayashi, Teruo; and Ishibashi, Masahiro, to Kabushiki Kaisha Toshiba. Master slice type semiconductor integrated circuit having 2 or more I/O cells per connection pad. 4,942,317, Cl. 307-465.000.

Taniguchi, Nobuyuki: *See*—
Norita, Toshio; Ishida, Tokuji; Hamada, Masataka; Karasaki, Toshihiko; and Taniguchi, Nobuyuki, 4,942,418, Cl. 354-408.000.

Taniguchi, Osamu; Kanbe, Junichiro; Okada, Shinjiro; Tsuboyama, Akira; and Enari, Masahiko, to Canon Kabushiki Kaisha. Ferroelectric liquid crystal device and driving method therefor. 4,941,736, Cl. 350-350.00S.

Taniguchi, Yoshikazu: *See*—
Shimizu, Tomoyuki; Taniguchi, Yoshikazu; Higuchi, Motohiro; and Suzuki, Masashi, 4,941,608, Cl. 236-12.120.

Tank, Klaus; and Pipkin, Noel J. Tool component. 4,941,891, Cl. 51-293.000.

Tank, Klaus; Pipkin, Noel J.; and Mastrantonis, Nicholas. Tool component. 4,941,892, Cl. 51-309.000.

Tansitor Electronics, Inc.: *See*—
Libby, Stuart E.; Lindskog, William J.; and Green, Gilbert, Jr., 4,942,500, Cl. 361-516.000.

Tarna, Tauno, to Sarvis Oy. Container. 4,941,586, Cl. 220-83.000.

Tarng, Lin J. Base point floating cut off wave form differential signal detector circuit. 4,942,315, Cl. 307-358.000.

Tarui, Keiji: *See*—
Yoshinouchi, Atsushi; Itoh, Masataka; Tsuchimoto, Shuhei; Tarui, Keiji; and Nishigaki, Satoshi, 4,942,481, Cl. 358-471.000.

Tarzaiski, Richard J.; and Hwang, Richard C., to General Electric Company. Analog to digital converter with multilayer printed circuit mounting. 4,942,400, Cl. 341-155.000.

Tate, Kazuhiko: *See*—
Tachibana, Yakudo; Tate, Kazuhiko; Suzuki, Toshifumi; and Chiba, Kouji, 4,942,257, Cl. 562-481.000.

Tausk, Edward F., to Navistar International Transportation Corp. Oil level gauge. 4,941,268, Cl. 33-729.000.

Tazo, Ken: *See*—
Shiraishi, Motoatsu; Sasagawa, Masaru; Tazo, Ken; Kubota, Masaaki; and Katayama, Shinji, 4,941,793, Cl. 414-225.000.

TDK Corporation: *See*—
Ohe, Kazuhide; Sato, Kazuo; Fukuda, Shunpei; and Nakada, Hiroyuki, 4,941,818, Cl. 431-268.000.

Teac Corporation: *See*—
Osawa, Tsuyoshi; and Yagami, Yasuo, 4,942,491, Cl. 360-104.000.
Umehara, Shinji; and Nakamura, Yukinobu, 4,942,485, Cl. 360-46.000.

Technical Chemical Company: *See*—
Berriochoa, Gary H.; and Dudley, Howard, 4,941,600, Cl. 222-402.130.

Techninon Research & Development Foundation: *See*—
Zeevi, Yehoshua Y.; Ar, Ran G.; and Hilsenrath, Oliver, 4,942,473, Cl. 358-213.260.

Tecle, Berhan, to Du Pont de Nemours, E. I., and Company. Solder paste formulation containing stannous fluoride. 4,941,929, Cl. 148-24.000.

Tecnol, Inc.: *See*—
Hubbard, Vance M.; and Brunson, Welton K., 4,941,470, Cl. 128-206.130.
Tecvac Limited: *See*—
Boston, Malcolm E., 4,942,304, Cl. 250-492.300.
Tegtmeyer, Kurt, to Salzgitter Maschinenbau GmbH. Screw press. 4,941,404, Cl. 100-117.000.
Teleflex Incorporated: *See*—
Carlson, John, 4,941,766, Cl. 403-131.000.
Telefunken electronic GmbH: *See*—
Schairer, Werner, 4,942,439, Cl. 357-17.000.
Telescope Casual Furniture Co.: *See*—
Vanderminden, Robert D., 4,941,413, Cl. 108-157.000.
Tellier, Raymond: *See*—
Guimond, Ronald; Martiniello, Anthony; Hardy, David W.; and Tellier, Raymond, 4,941,846, Cl. 439-578.000.
Telnet Electronics Laboratories, Inc.: *See*—
Satterwhite, James R., 4,942,365, Cl. 328-134.000.
Temple, Stephen: *See*—
Paton, Anthony D.; Temple, Stephen; and Shepherd, Mark R., 4,942,409, Cl. 346-140.00R.
Tenerz, Lars; Hook, Bertil; and Engstrom, Thomas, to Radisensor AB. Guide for mechanical guiding of a catheter in connection with cardio and vascular examination. 4,941,473, Cl. 128-637.000.
Tengler, John N.; and Venaleck, John T., to Minnesota Mining and Manufacturing Co. Coaxial cable termination system. 4,941,831, Cl. 439-63.000.
Terada, Hisashi, to Kabushiki Kaisha Kenwood. Optimum clock generator in data communication. 4,942,590, Cl. 375-1.000.
Terada, Yoshinobu, to Honda Giken Kogyo Kabushiki Kaisha. Fuel tank system. 4,941,587, Cl. 220-85.0VS.
Terashita, Takaaki; and Okada, Sethuo, to Fuji Photo Film Co., Ltd. Method of and apparatus for printing color photograph as well as color filter for use in the same apparatus. 4,942,424, Cl. 355-38.000.
Terayama, Satoshi: *See*—
Aoki, Takashi; Terayama, Satoshi; and Miyake, Junichi, 4,941,372, Cl. 74-878.000.
Terry, Dralen T.: *See*—
Brothers, Lance E.; Lindsey, Donald W.; and Terry, Dralen T., 4,941,536, Cl. 166-293.000.
Tetaz, John R.: *See*—
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Texaco Inc.: *See*—
Bartels, Craig R.; and Reale, John, Jr., 4,941,976, Cl. 210-490.000.
Benfaremo, Nicholas; Kapuscinski, Maria M.; and Nalesnik, Theodore E., 4,941,985, Cl. 252-51.50R.
Dai, Pei-Shing E.; Sherwood, David E., Jr.; Bartley, Burton H.; and Petty, Randall H., 4,941,964, Cl. 208-216.0PP.
Porter, Gary L.; and Cade, William B., 4,941,535, Cl. 166-285.000.
Texas Instruments Incorporated: *See*—
Wilkinson, Thomas F., 4,941,429, Cl. 118-715.000.
Texpa Arbter Maschinenbau GmbH: *See*—
Henze, Siegfried; Ziegler, Hans; and Schnaus, Martin, 4,941,418, Cl. 112-304.000.
Thermacon, Inc.: *See*—
Monter, Robert P.; and Smith, Ronald L., 4,942,286, Cl. 219-219.000.
Thermacore, Inc.: *See*—
Toth, Jerome E.; and Ernst, Donald M., 4,941,527, Cl. 165-47.000.
Thermadyne, Inc.: *See*—
Ruff, John D., 4,941,902, Cl. 62-532.000.
Thin Film Technology Corporation: *See*—
Ozawa, Paul; Brooks, Mark; and Nakanata, Fumitoshi, 4,942,373, Cl. 333-161.000.
Thomas, Charles E., to General Electric Company. Apparatus and method for tool break and wear detection. 4,942,387, Cl. 340-683.000.
Thomas, Judith A.: *See*—
Thomas, Ronald K.; and Thomas, Judith A., 4,941,601, Cl. 223-24.000.
Thomas, Ronald K.; and Thomas, Judith A. Cap drier and shaper. 4,941,601, Cl. 223-24.000.
Thomas, Timothy S.: *See*—
Hickey, Charles F., Jr.; and Thomas, Timothy S., 4,941,927, Cl. 148-11.50Q.
Thomas, William M.: *See*—
Stewart, G. Wayne; Davis, Bill E.; Thomas, William M.; Dobie, Michael J.; and Bacigalupe, Carlos, 4,941,819, Cl. 432-8.000.
Thompson, John S.: *See*—
Williams, Wilbur R.; Bornzin, Gene A.; and Thompson, John S., 4,941,475, Cl. 128-692.000.
Thomson-CSF: *See*—
Lehureau, Jean-Claude, 4,942,490, Cl. 360-126.000.
Thorn Emi Electronics Limited: *See*—
Prewer, Brian E.; and Milner, Brian, 4,942,402, Cl. 342-1.000.
Voles, Roger, 4,942,301, Cl. 250-338.300.
Thrasher, William H; Pavlik, Charles M.; and Moon, Larry, to Gas Research Institute. Pulse combustion space heater. 4,941,452, Cl. 126-110.00R.
Thuerman, John H., to Rexnord Corporation. Wear resistant chain for trenchers. 4,941,315, Cl. 59-78.000.
Thumm, Hermann J., to Chateau Yaldara Pty. Ltd. Grape juice concentrate. 4,942,045, Cl. 426-11.000.
Tibbals, E. C., Jr. Circular weft knitting machine sinker. 4,941,332, Cl. 66-104.000.
Tiburtius, Heinfried. Use of beta blockers for the treatment of the progression of infantile axial myopia. 4,942,161, Cl. 514-231.200.
Tieke, Bernd: *See*—
Decher, Gero; and Tieke, Bernd, 4,941,997, Cl. 252-586.000.
Tietjen, Klaus-Gunther: *See*—
Muller, Klaus-Helmut; Kluth, Joachim; Tietjen, Klaus-Gunther; Santel, Hans-Joachim; Schmidt, Robert R.; and Strang, Harry, 4,941,910, Cl. 71-92.000.
Tillia Aktiengesellschaft: *See*—
Kristen, Hanns J., 4,941,310, Cl. 53-512.000.
Timex Corporation: *See*—
Sherman, Norman; and Shiff, Victor, 4,941,236, Cl. 24-303.000.
Timp, Gregory L.: *See*—
Fowler, Alan B.; and Timp, Gregory L., 4,942,437, Cl. 357-16.000.
Tkazyik, William J.; and Urfer, Robert G., to International Business Machines Corp. Edge design for printed circuit board connector. 4,941,830, Cl. 439-59.000.
Toa Nenryo Kogyo, K.K.: *See*—
Furuhashi, Hiroyuki; Nakano, Akira; Murata, Masahide; Imai, Masafumi; and Ueno, Hiroshi, 4,942,148, Cl. 502-115.000.
Tobias, Samuel; Treene, William E.; and Williams, George E., to Hayward Industries, Inc. Flow enhancing jet fitting. 4,941,217, Cl. 4-542.000.
Tobita, Haruya: *See*—
Miyagaki, Hisanori; Shimizu, Katsuhito; Tobita, Haruya; Takita, Atsushi; Kimura, Tooru; Sugano, Akira; Kikuchi, Masayuki; and Fukai, Masayuki, 4,942,514, Cl. 364-190.000.
Toda Kogyo Corp.: *See*—
Hamamura, Atsushi; Hamada, Takaki; Nakamura, Hiroko; Imai, Tomoyuki; Matsui, Toshiki; and Horiishi, Nanao, 4,942,098, Cl. 428-555.000.
Toda, Minoru, to General Electric Company. Amplifier device with coupled surface emitting grating. 4,942,366, Cl. 330-4.300.
Toda, Yasushi: *See*—
Yoneda, Ko; Toda, Yasushi; Matsuda, Tooru; Makino, Kenji; and Nagata, Kenji, 4,942,489, Cl. 360-121.000.
Tofte, Semor D.: *See*—
Hiniker, Thomas K.; and Tofte, Semor D., 4,942,558, Cl. 367-91.000.
Tokai Rubber Industries, Ltd.: *See*—
Funahashi, Yoshiki; and Hibi, Masayuki, 4,941,649, Cl. 267-140.100.
Tokico Ltd.: *See*—
Nakamura, Ken; Onoda, Toshiaki; and Gofuku, Yoshihiro, 4,941,640, Cl. 248-562.000.
Tokunaga, Hirohiko: *See*—
Sakamoto, Yujiro; Kurosaka, Toshio; Fukumoto, Hirohiko; Miyake, Toshiya; and Tokunaga, Hirohiko, 4,941,628, Cl. 244-12.200.
Tokyo Electric Co., Ltd.: *See*—
Nakamura, Shinya, 4,942,477, Cl. 358-401.000.
Tokyo Electron Limited: *See*—
Koike, Hisashi; Takao, Itaru; Narushima, Masaki; and Takekoshi, Kiyoshi, 4,941,800, Cl. 414-752.000.
Tokyo Kogaku Kikai Kabushiki Kaisha: *See*—
Yokokura, Takashi; Hori, Nobuo; Shimozono, Hiroaki; and Niimura, Satoru, 4,941,744, Cl. 356-358.000.
Tokyo Ohka Kogyo Co., Ltd.: *See*—
Sago, Hiroyoshi; Mizuki, Hideyuki; Kudo, Katsuhiko; and Nakayama, Muneo, 4,941,426, Cl. 118-52.000.
Tomasi, Philip J.: *See*—
Darden, Julius C.; Praca, Miguel M.; and Tomasi, Philip J., 4,941,841, Cl. 439-377.000.
Tomikawa, Takashi: *See*—
Asada, Eiji; Tomikawa, Takashi; and Fukuoka, Tatsuhiko, 4,941,919, Cl. 75-235.000.
Tomimatsu, Kiminori: *See*—
Kishimoto, Shoji; Tomimatsu, Kiminori; and Miyake, Akio, 4,942,159, Cl. 514-202.000.
Tominaga, Kenji, to Tomy Seiko Co., Ltd. Container rotor for a centrifugal separator. 4,941,867, Cl. 494-16.000.
Tomisawa, Naoki: *See*—
Nakaniwa, Shinpei; and Tomisawa, Naoki, 4,941,448, Cl. 123-488.000.
Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; Nakata, Takashi; and Horaguchi, Yoichi, to Brother Kogyo Kabushiki Kaisha. Heat/pressure applying unit for copying apparatus. 4,942,420, Cl. 355-27.000.
Tomizawa, Takashi: *See*—
Yamada, Makoto; Nagata, Osamu; Sugiura, Toshio; Suzuki, Tsuyoshi; Ishida, Kazuhito; Shibata, Eiji; Makino, Kazumasa; Horaguchi, Yoichi; Tomizawa, Takashi; Hayashi, Shigeyuki; Ohno, Motoshi; and Nakata, Takashi, 4,942,430, Cl. 355-232.000.
Tomoda, Atsuo; Itoh, Takaaki; and Kijima, Takao, to Mazda Motor Corporation. Automotive four wheel steering system. 4,941,542, Cl. 180-140.000.
Tomy Company, Ltd.: *See*—
Ohashi, Michiya, 4,942,502, Cl. 362-35.000.
Tomy Kogyo Co., Inc.: *See*—
Fujimaki, Hiroaki, 4,941,857, Cl. 446-353.000.
Tomy Seiko Co., Ltd.: *See*—
Tominaga, Kenji, 4,941,867, Cl. 494-16.000.
Tonachel, Pierre A.: *See*—
Chang, Robert P., 4,941,944, Cl. 162-19.000.
Tong, Ronnie Chi-on: *See*—
Do, Phuc K.; Kellam, Karen K.; Tong, Ronnie Chi-on; Willis, Ronald W.; and Wyke, Carol E., 4,942,390, Cl. 340-735.000.

Toppan Moore Co., Ltd.: *See*—
Sano, Shigeaki, 4,942,352, Cl. 320-2.000.
Toray Industries, Inc.: *See*—
Umezawa, Masao; Tsubota, Toshio; and Imai, Shiro, 4,942,091, Cl. 428-398.000.
Toriyama, Masayuki: *See*—
Yamamoto, Hitoshi; Tottori, Takumi; and Toriyama, Masayuki, 4,941,319, Cl. 60-314.000.
Tornatore, Massimo: *See*—
Fornasier, Roberto; Tornatore, Massimo; and Chapoy, L. Lowrence, 4,942,233, Cl. 544-212.000.
Toshiba Kikai Kabushiki Kaisha: *See*—
Kunugi, Takashi; and Sasaki, Yoshinari, 4,942,611, Cl. 364-474.060.
Toshiba Silicon Co., Ltd.: *See*—
Zama, Yoshiaki; Umeda, Itsuki; Takemura, Yasuhiko; Takashima, Masaaki; Funabashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Yoshida, Hiromichi, 4,942,202, Cl. 525-104.000.
Toth, Jerome E.; and Ernst, Donald M., to Thermacore, Inc. Heat pipe with temperature gradient. 4,941,527, Cl. 165-47.000.
Tottori, Takumi: *See*—
Yamamoto, Hitoshi; Tottori, Takumi; and Toriyama, Masayuki, 4,941,319, Cl. 60-314.000.
Totty, Kenneth D.: *See*—
Murphey, Joseph R.; and Totty, Kenneth D., 4,942,186, Cl. 523-131.000.
Toulson, Luther: *See*—
Lopez, David A.; and Toulson, Luther, 4,941,597, Cl. 222-146.500.
Toussaint, Daniel, to Belgian Electronic Research S. A. Fixation device with adjustable tilting. 4,942,498, Cl. 361-388.000.
Toyne, Kenneth J.: *See*—
Jackson, Adam; Scrowston, Richard M.; Gray, George W.; Lacey, David; and Toyne, Kenneth J., 4,941,992, Cl. 252-299.660.
Toyo Boseki Kabushiki Kaisha: *See*—
Yatsuka, Takeshi; Yamazoe, Seiji; Hirakouchi, Hiroshi; Mizumura, Yutaka; Endo, Hiroshi; and Kadowaki, Nobuo, 4,942,219, Cl. 528-272.000.
Toyo Engineering Corporation: *See*—
Kasai, Hiroshi; and Kawamoto, Yuji, 4,942,022, Cl. 422-201.000.
Toyo Tire & Rubber Co., Ltd.: *See*—
Yoshida, Yasunori; Nakayama, Rinichi; and Iwama, Satoshi, 4,942,197, Cl. 524-496.000.
Toyoda, Shigeaki; Watanabe, Shunnosuke; and Tabata, Hiroshi, to Agro-Kanesho Co., Ltd. Plant protection agents for control of fungi. 4,942,178, Cl. 514-617.000.
Toyota Jidosha Kabushiki Kaisha: *See*—
Matsuoka, Hiroki, 4,941,318, Cl. 60-274.000.
Nomura, Yoshihisa; and Noguchi, Noboru, 4,941,322, Cl. 60-547.100.
Suzuki, Yasushi; Takahara, Yasuo; Masui, Atusi; Ohshima, Toshihiro; Takeuchi, Fumihiro; Sugiyama, Toshiki; and Setoguchi, Tadashi, 4,941,437, Cl. 123-41.120.
Takayama, Kazuo; and Fuse, Hidefumi, 4,942,622, Cl. 455-278.000.
Traveling Software, Inc.: *See*—
Eppley, Mark; and Rysavy, Peter B., 4,941,845, Cl. 439-505.000.
Treene, William E.: *See*—
Tobias, Samuel; Treene, William E.; and Williams, George E., 4,941,217, Cl. 4-542.000.
Treiber, Helmut: *See*—
Wilsch, Herbert; Huber, Leonhard; Treiber, Helmut; Lermann, Peter; and Nagel, Erich, 4,941,620, Cl. 242-67.10R.
Trend, John E.; and Rochford, Kent B., to Minnesota Mining and Manufacturing Company. Inclusion complexes providing second harmonic generation. 4,941,996, Cl. 252-584.000.
Tresper, Erhard: *See*—
Bier, Peter; Reinking, Klaus; Bottenbruch, Ludwig; and Tresper, Erhard, 4,942,194, Cl. 524-281.000.
Trimble, Brent J. Tubular bicycle frame. 4,941,674, Cl. 280-281.100.
Troger, Wolfgang: *See*—
Reinertz, Ulrich; Troger, Wolfgang; and Wockel, Jurgen, 4,941,599, Cl. 222-401.000.
Troster, Manfred: *See*—
De Boer, Johannes; and Troster, Manfred, 4,941,368, Cl. 74-527.000.
Trundle, Clive, to Plessey Overseas Limited. Contrast enhanced photolithography. 4,942,113, Cl. 430-326.000.
TRW Inc.: *See*—
Asawa, Charles K.; Yao, Shi-Kay; and Anderson, John D., 4,942,623, Cl. 455-612.000.
Tsang, Randy: *See*—
Capson, David W.; and Tsang, Randy, 4,941,256, Cl. 29-833.000.
Tsubota, Toshio: *See*—
Umezawa, Masao; Tsubota, Toshio; and Imai, Shiro, 4,942,091, Cl. 428-398.000.
Tsuboyama, Akira: *See*—
Taniguchi, Osamu; Kanbe, Junichiro; Okada, Shinjiro; Tsuboyama, Akira; and Enari, Masahiko, 4,941,736, Cl. 350-350.00S.
Tsuchimoto, Shuhei: *See*—
Yoshinouchi, Atsushi; Itoh, Masataka; Tsuchimoto, Shuhei; Tarui, Keiji; and Nishigaki, Satoshi, 4,942,481, Cl. 358-471.000.
Tsuchiya, Yutaka: *See*—
Koishi, Musubu; Tsuchiya, Yutaka; Hara, Tomoyoshi; and Suzuki, Kenji, 4,942,293, Cl. 250-213.0VT.
Sugimoto, Hachiro; Nakamura, Takaharu; Tsuchiya, Yutaka; Sugumi, Hiroyuki; Higurashi, Kunizou; Karibe, Norio; Yamanishi, Yoshiharu; Ogura, Hiroo; Araki, Shin; Kubota, Atsuhiko; Ohtake, Michiko; and Tamatsu, Kiyomi, 4,942,169, Cl. 514-318.000.
Tsuchiyama, Tadashi: *See*—
Ishikawa, Keiichi; Tsuchiyama, Tadashi; Suzuki, Yasuyuki; and Hasegawa, Hiroaki, 4,941,559, Cl. 192-107.00R.
Tsuda, Yukio, to Kabushiki Kaisha Toshiba. Laser printer with clock polygon control for inches and millimeters. 4,942,406, Cl. 346-108.000.
Tsukakoshi, Osamu, to Nihon Shinku Gijutsu Kabushiki Kaisha. Parallel sweeping system for electrostatic sweeping ion implanter. 4,942,342, Cl. 315-410.000.
Tsukamoto, Katsuhiro; Imuishi, Masahide; and Shimizu, Masahiro, to Mitsubishi Denki Kabushiki Kaisha. Structure for isolating semiconductor components on an integrated circuit and a method of manufacturing therefor. 4,942,448, Cl. 357-49.000.
Tsukinuki, Kazuto: *See*—
Saeki, Kazumi; Hirano, Masami; Oka, Kunihide; Tsukinuki, Kazuto; and Oikawa, Setsuo, 4,942,229, Cl. 540-310.000.
Tsuneoka, Masayuki: *See*—
Yokouchi, Hisatake; Huno, Takakazu; Onodera, Yoichi; Koike, Kouichi; and Tsuneoka, Masayuki, 4,942,468, Cl. 358-138.000.
Tsunoda, Kikuo: *See*—
Ishikawa, Youhei; Tsunoda, Kikuo; Hiratsuka, Toshiro; and Abe, Hirotsugu, 4,942,377, Cl. 333-202.000.
Tsuruoka, Masatomi: *See*—
Hirota, Ryuichi; Tsuruoka, Masatomi; and Inoue, Shinichi, 4,941,565, Cl. 198-601.000.
Tsutsui, Ichiro: *See*—
Chikuma, Takashi; and Tsutsui, Ichiro, 4,942,471, Cl. 358-165.000.
Tubettificio Europa S.p.A.: *See*—
Pasini, Roberto, 4,941,621, Cl. 242-118.100.
Turner, John: *See*—
Shires, Jonathanes;; and Turner, John, 4,942,509, Cl. 363-89.000.
Turpen, Jon D., to Turpen Laboratory Systems, Inc. Random access chemistry analyzer. 4,942,017, Cl. 422-64.000.
Turpen Laboratory Systems, Inc.: *See*—
Turpen, Jon D., 4,942,017, Cl. 422-64.000.
Turro, Victor R.: *See*—
Montaner, Pedro P.; and Turro, Victor R., 4,941,595, Cl. 222-321.000.
Tzeng, Donald D.: *See*—
Baum, Kurt; Malik, Aslam A.; and Tzeng, Donald D., 4,942,164, Cl. 528-70.000.
U-Haul International: *See*—
Curry, William J., 4,941,703, Cl. 296-37.600.
UBE Industries, Ltd.: *See*—
Kunimoto, Akihiro; and Umemoto, Noboru, 4,942,007, Cl. 264-122.000.
Takabayashi, Seiichirou; and Egami, Masaki, 4,942,092, Cl. 428-401.000.
Ube-Nitto Kasei Co., Ltd.: *See*—
Okada, Masao; Sakai, Kazuhiko; Kimura, Haruo; and Ikada, Yoshito, 4,941,870, Cl. 600-36.000.
Uchida, Haruhiko: *See*—
Nasu, Yasunobu; Ogishima, Taichi; Dei, Akira; Uchida, Haruhiko; Inami, Mitsuru; Furuhashi, Tatsuo; Hino, Yasuhiko; and Sugimura, Hideo, 4,942,048, Cl. 426-271.000.
Uchida, Yoshiaki: *See*—
Takahashi, Hideharu; and Uchida, Yoshiaki, 4,941,854, Cl. 440-1.000.
Uchiyama, Yukihiro: *See*—
Murakami, Kenjiro; and Uchiyama, Yukihiro, 4,941,762, Cl. 400-636.100.
Uebel, Lutz: *See*—
Richter, Wolfgang-Dieter; Weeger, Engelbert; Uebel, Lutz; and Foerster, Erhard, 4,941,409, Cl. 105-157.100.
Uematsu, Ryosuke; Shindo, Kazunori; Kariya, Yoshinobu; and Oikawa, Shinro, to NEC Corporation. Liquid development apparatus with perforated liquid carrier sheet. 4,942,475, Cl. 355-256.000.
Ueno, Hiroshi: *See*—
Furuhashi, Hiroyuki; Nakano, Akira; Murata, Masahide; Imai, Masafumi; and Ueno, Hiroshi, 4,942,148, Cl. 502-115.000.
Ueno, Naoya: *See*—
Takase, Minoru; Ueno, Naoya; and Arashi, Toshimi, 4,941,730, Cl. 350-96.340.
Uhoch, John: *See*—
Felix, Augustus; and Uhoch, John, 4,941,872, Cl. 604-27.000.
Ukima Colour & Chemicals Mfg. Co., Ltd.: *See*—
Hanada, Kazuyuki; Kuroda, Kohichi; Misaizu, Iwao; Kashimura, Masashi; Goto, Tomoko; and Kuriyama, Katsumi, 4,942,212, Cl. 528-28.000.
Ullmann, Gerhard: *See*—
Schaffner, Kurt; Swozil, Adolf; and Ullmann, Gerhard, 4,941,692, Cl. 285-114.000.
Ullrich, Martin: *See*—
Pusch, Werner; and Ullrich, Martin, 4,941,748, Cl. 366-85.000.
Ulrich, Helmut: *See*—
Fauck, Gerhard; Pohl, Wolfgang; and Ulrich, Helmut, 4,941,510, Cl. 137-627.500.
Ulrich, Peter C.: *See*—
Henderson, Graeme B.; Ulrich, Peter C.; and Cerami, Anthony, 4,942,170, Cl. 514-326.000.
Ultradent Products, Inc.: *See*—
Fischer, Dan E., 4,941,873, Cl. 604-54.000.
Ultrox International: *See*—
Zeff, Jack D.; and Leitis, Eriks, 4,941,957, Cl. 204-157.300.

Umeda, Itsuki: *See*—
Zama, Yoshiaki; Umeda, Itsuki; Takemura, Yasuhiko; Takashima, Masaaki; Funabashi, Yuichi; Watanabe, Junichiro; Takeda, Kiyoshi; and Yoshida, Hiromichi, 4,942,202, Cl. 525-104.000.

Umeda, Osamu; Nakakusu, Tohru; Sato, Makoto; and Shimazaki, Tatsuo, to Casio Computer Co., Ltd. Transmission type projection screen. 4,941,732, Cl. 350-128.000.

Umehara, Shinji; and Nakamura, Yukinobu, to Teac Corporation. Apparatus capable of data reproduction from digital tape cassettes or like storage media employing two different recording methods. 4,942,485, Cl. 360-46.000.

Umemoto, Noboru: *See*—
Kunimoto, Akihiro; and Umemoto, Noboru, 4,942,007, Cl. 264-122.000.

Umezawa, Masao; Tsubota, Toshio; and Imai, Shiro, to Toray Industries, Inc. Polyphenylene sulfone fibers and a method for production thereof. 4,942,091, Cl. 428-398.000.

Underhill, Kimberly K.: *See*—
Wendt, Greg A.; Underhill, Kimberly K.; Rugowski, James S.; Kressner, Bernhardt E.; and Chiu, Kai F., 4,942,077, Cl. 428-152.000.

Ungar, Jeffrey E., to Ortel Corporation. High power semiconductor laser. 4,942,585, Cl. 372-44.000.

Uni-Charm Corporation: *See*—
Nomura, Hironori; Shimakawa, Taiji; Shinohara, Junji; Kobayashi, Shigetoyo; and Yamamoto, Hiroki, 4,941,939, Cl. 156-495.000.

Union Carbide Chemicals and Plastics Company, Inc.: *See*—
Hsieh, Shan-Tao; and Keller, George E., II, 4,941,893, Cl. 55-16.000.
Karol, Frederick J.; Sun-Chueh, Kao; and Drage, James S., 4,942,147, Cl. 502-113.C00.
Keogh, Michael J., 4,942,069, Cl. 428-389.000.

Union Carbide Corporation: *See*—
Pelton, John F., 4,941,647, Cl. 266-285.000.

Union Oil Company of California: *See*—
Young, Donald C., 4,942,254, Cl. 558-250.000.

Union Tank Car Company: *See*—
Dalrymple, Thomas H.; and Zagrocki, Richard L., 4,941,410, Cl. 105-358.000.

Unisys Corp.: *See*—
Davies, Michael L.; and Weber, Lawrence, 4,941,636, Cl. 271-278.000.
Peterson, LuVerne R., 4,942,398, Cl. 341-118.000.
Smith, Patrick J.; Leahy, Ronald S.; and Bullock, Scott R., 4,942,589, Cl. 375-1.000.
Woodward, Thomas R., 4,942,573, Cl. 370-85.900.

United Kingdom Atomic Energy Authority: *See*—
Durow, Kenneth M., 4,942,014, Cl. 376-261.000.

United Kingdom of Great Britain and Northern Ireland, The Secretary of State for Defence in Her Britannic Majesty's Government of the: *See*—
Jackson, Adam; Scrowston, Richard M.; Gray, George W.; Lacey, David; and Toyne, Kenneth J., 4,941,992, Cl. 252-299.660.

U.S. Natural Resources, Inc.,: *See*—
Ramakrishnan, Rengaswamy; and Callaway, Michael D., 4,941,901, Cl. 62-262.000.

United States of America
Agriculture: *See*—
Powell, Richard G.; Mikolajczak, Kenneth L.; Zilkowski, Bruce W.; Clardy, Jon; and Mantus, Ellen K., 4,942,247, Cl. 548-505.000.
Army: *See*—
Hickey, Charles F., Jr.; and Thomas, Timothy S., 4,941,927, Cl. 148-11.50Q.
Quinn, George D.; and Goulet, Raymond L., 4,941,359, Cl. 73-851.000.
Sayles, David C., 4,941,931, Cl. 149-19.200.
Energy: *See*—
Hershcovitch, Ady; Kovarik, Vincent J.; and Prelec, Krsto, 4,942,339, Cl. 315-111.810.
Johnson, Stanley A.; Reedy, Gerald T.; and Kumar, Romesh, 4,942,297, Cl. 250-304.000.
Sheinberg, Haskell; Meek, Thomas T.; and Blake, Rodger D., 4,942,278, Cl. 219-10.55M.
Zaromb, Solomon, 4,942,135, Cl. 436-178.000.
Health and Human Services: *See*—
Haugwitz, Rudiger D.; Zalkow, Leon; Glinski, Jan; Suffness, Mathew; Deutsch, Howard M.; and Narayanan, Venkatachala, 4,942,184, Cl. 514-449.000.
Navy: *See*—
Elton, Raymond C., 4,942,580, Cl. 372-5.000.
Moscrip, William M., 4,941,627, Cl. 244-3.210.
Russell, Stephen D.; and Stamnitz, Timothy C., 4,941,726, Cl. 350-96.150.
Winyard, David C., 4,941,811, Cl. 418-195.000.

U.S. Philips Corporation: *See*—
Bruns, Angelika M.; Harms, Margret; Luthje, Holger K. G.; and Matthiessen, Bernd, 4,941,942, Cl. 156-657.000.
Mutsaers, Cornelis A. H. A.; De Leeuw, Dagobert M.; Klaassen, Dirk B. M.; and Ronda, Cornelis R., 4,942,335, Cl. 313-468.000.
Petitjean, Gilbert; Lebourg, Michel; and Le Tortorec, Christian, 4,942,375, Cl. 333-81.00R.
Van Acker, Paul A. F.; and Van Der Velden, Alphonsus T., 4,942,597, Cl. 378-197.000.

U.S. Phillips Corporation: *See*—
Khoe, Giok D.; and Wong, Ching K., 4,942,568, Cl. 370-3.000.

United States Surgical Corporation: *See*—
Pruitt, J. Crayton, 4,941,623, Cl. 227-19.000.

United Technologies Automotive, Inc.: *See*—
Wright, James A., 4,941,258, Cl. 29-858.000.

United Technologies Corp.: *See*—
Harrell, Sarah R.; and Rowland, John D., 4,942,581, Cl. 372-9.000.
Russell, Sid, 4,941,617, Cl. 239-400.000.
Sigman, Warren R., 4,941,740, Cl. 350-636.000.
Wainauski, Harry S.; and Vaczy, Carol M., 4,941,803, Cl. 416-242.000.

Unitika, Ltd.: *See*—
Yasuda, Takuo; Kondo, Hitoshi; Echigo, Yoshiaki; Ohnawa, Tsuneyuki; and Maekawa, Yoshiaki, 4,942,192, Cl. 524-44.000.

Universal Co., Ltd.: *See*—
Okada, Kazuo, 4,941,840, Cl. 439-376.000.

University of Akron, The: *See*—
Kennedy, Joseph P., 4,942,204, Cl. 525-293.000.

University of British Columbia: *See*—
Grudic, Gregory Z.; Kelly, Michael F.; and Lawrence, Peter D., 4,941,739, Cl. 350-486.000.

University of California, The Regents of the: *See*—
Casida, John E.; Palmer, Christopher J.; Larkin, John P.; and Smith, Ian H., 4,942,173, Cl. 514-452.000.
Lee, Wen-Hwa; and Lee, Eva Y. - H. P., 4,942,123, Cl. 435-6.000.

University of Colorado Foundation, Inc.: *See*—
Moddel, Garret R.; and Johnson, Kirstina M., 4,941,735, Cl. 350-342.000.

University of Florida: *See*—
Nevill, Gale E., Jr., 4,942,620, Cl. 382-58.000.
Winefordner, James D.; and Jones, Bradley T., 4,942,134, Cl. 436-161.000.

University of Florida Research Foundation, Incorporated: *See*—
Osborne, Lance S., 4,942,030, Cl. 424-93.000.

University of Kansas, The: *See*—
Buller, Clarence S.; and Vossoughi, Shapour, 4,941,533, Cl. 166-252.000.

University of Minnesota, Regents of the: *See*—
Anderson, Robert K.; Foster, Ruth E.; and Carlson, Bertyl W., 4,941,313, Cl. 54-24.000.
Liu, Benjamin Y. H., 4,941,899, Cl. 55-270.000.

University of Tennessee Research Corporation: *See*—
Rosenberg, E. William; and Belew-Noah, Patricia W., 4,942,162, Cl. 514-252.000.

University Patents, Inc.: *See*—
Farwell, Lawrence A., 4,941,477, Cl. 128-731.000.

Unland, Georg: *See*—
Durr, Manfred; Unland, Georg; Rother, Wolfgang; Driemeier, Gunter; and Schmits, Heinz-Herbert, 4,941,821, Cl. 432-106.000.

Urfer, Robert G.: *See*—
Tkazyik, William J.; and Urfer, Robert G., 4,941,830, Cl. 439-59.000.

Urh, John: *See*—
Hildebrand, Karl J.; and Urh, John, 4,941,618, Cl. 239-432.000.

Usami, Toshimasa; Tanaka, Toshiharu; and Kiritani, Masataka, to Fuji Photo Film Co., Ltd. Heat-sensitive recording material. 4,942,150, Cl. 503-213.000.

USG Interiors, Inc.: *See*—
Luszczak, Myron M., 4,941,949, Cl. 162-310.000.

Utengen, S. F.: *See*—
Johansen, Trond V.; Ruch, Ola; Naess, Ludvig; Kristjansson, K. P.; and Utengen, S. F., 4,941,511, Cl. 138-89.000.

Uttenweiler, Winfried: *See*—
Denz, Helmut; Moz, Rudolf; and Uttenweiler, Winfried, 4,941,446, Cl. 123-414.000.

Vaczy, Carol M.: *See*—
Wainauski, Harry S.; and Vaczy, Carol M., 4,941,803, Cl. 416-242.000.

Vaglica, John J.: *See*—
Wilkie, Brian F.; Goler, Vernon B.; Groves, Stanley E.; and Vaglica, John J., 4,942,522, Cl. 364-200.000.

Valdepenas, Jose M.: *See*—
Goodlander, Theodore J.; Valdepenas, Jose M.; McCaskey, Ricardo E. V.; and Vizcaino, Gerardo, 4,942,579, Cl. 371-51.000.

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Valmont Industries, Inc.: *See*—
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Valyocsik, Ernest W., to Mobil Oil Corp. Synthesis of crystalline ZSM-11 structure. 4,941,963, Cl. 208-46.000.

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VanBeneden, Floyd V. Fluoridated dental floss. 4,941,487, Cl. 132-323.000.

Van Buskirk, Ellor J.; and Maska, Rudolf, to PPG Industries, Inc. Temporary protective coating compositions. 4,942,193, Cl. 524-276.000.

Vandenbergh, Peter A.; and Kunka, Blair S., to Microlife Technics, Inc. Process for producing a novel antifungal product. 4,942,032, Cl. 424-115.000.

Van den Heuvel, Anthony P.: *See*—
Kotzin, Michael D.; Crisler, Kenneth J.; Mohl, Lawrence M.; Saltzberg, Theodore; Hong, Dachyoung; and Van den Heuvel, Anthony P., 4,942,570, Cl. 370-80.000.

Van Der Meer, Roelof: *See*—
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Van Der Velden, Alphonsus T.: *See*—
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Van Marcke, Karel C., to International Sanitary Ware Manufacturing Cy, S.A. Body heat responsive valve control apparatus. 4,941,219, Cl. 4-623.000.

Vann, Clifton B., III, to L & H Technologies, Inc. Microporous filter and method. 4,941,897, Cl. 55-158.000.

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De Schepper, Achille J.; Haesebroek, Guy G.; and Van Peteghem, Antoine L., 4,942,023, Cl. 423-22.000.

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Van Tassel, Gary W., to Ocean Tech Marine, Inc. Marine propulsion system. 4,941,423, Cl. 114-289.000.

Vassiliadis, Stamatis, to International Business Machines Corporation. Parallel adder having removed dependencies. 4,942,548, Cl. 364-784.000.

Vassiliou, E.: *See*—
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Veba Oel Entwicklungs-Gesellschaft mbH: *See*—
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Venaleck, John T.: *See*—
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Venturini, Aldo. Disposable safety syringe. 4,941,883, Cl. 604-186.000.

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Verkuil, Steve. Vertical fishing trip-up. 4,941,278, Cl. 43-15.000.

Verry, Edward H., to Fiber Materials, Inc. System for assembling and disassembling a mast. 4,942,537, Cl. 364-512.000.

Vetterling, William T., to Polaroid Corporation. Superlattice avalanche photodetector. 4,942,436, Cl. 357-4.000.

VG Instruments Group Limited: *See*—
Jones, David S., 4,942,296, Cl. 250-288.000.

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Visser, Douglas L. Vehicle service area floor mat. 4,941,551, Cl. 184-106.000.

Vitale, Roger H.; and Howard, Ronald F. Downrigger with leverage line clamp and fish attracting means. 4,941,281, Cl. 43-43.120.

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Vorwerk & Co. Interholding GmbH: *See*—
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Vossoughi, Shapour: *See*—
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Vrenning, Jorgen. Lashing machine. 4,941,515, Cl. 140-119.000.

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Sakhpara, Dilip J., 4,942,214, Cl. 528-59.000.

W. P. Dawson, Inc.: *See*—
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Wada, Henry G.; McConnell, Harden; and Hafeman, Dean G., to Molecular Devices Corporation. Polyredox couples in analyte determinations. 4,942,127, Cl. 435-11.000.

Wade, John R.; Burch, Jeremy R.; and Potts, Rodney M., to Vickers PLC. Printing plate precursors. 4,942,111, Cl. 430-273.000.

Wagener, Harry, to AUER-SOG Glaswerke GmbH. Reflector for dental and surgical operating room lighting fixtures. 4,942,507, Cl. 362-296.000.

Wagenknecht, Marcel, to Jaquet Orthopedie, S.A. Device for positioning and securing a part having circular regions. 4,941,481, Cl. 606-59.000.

Waibel, Terry J.: *See*—
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Wainauski, Harry S.; and Vaczy, Carol M., to United Technologies Corporation. Airfoiled blade. 4,941,803, Cl. 416-242.000.

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Walker, MacQuarrie. Tennis service catching net. 4,941,663, Cl. 273-29.00A.

Walker, Paul. Linoleum roll heater assembly. 4,942,287, Cl. 219-385.000.

Walker, Robert L.; and Homan, William E. Rope support device. 4,941,633, Cl. 248-228.000.

Walkow, Arnold M.; Kennedy, William S.; and Wolfe, Kenneth J., to Western Atlas International, Inc. Coaxial coiled-tubing cable head. 4,941,349, Cl. 73-151.000.

Wall, Gregory D.: *See*—
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Wampler, Galen L.: *See*—
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Waraksa, Thomas J.; Fraley, Keith D.; Kiefer, Richard E.; Douglas, Daniel G.; and Gilbert, Lee H., to Lectron Products, Inc. Passive keyless entry system. 4,942,393, Cl. 340-825.720.

Ward, Charles A., to HSC Research Development Corporation. Preparation of synthetic materials for implantation in mammalian tissue. 4,941,871, Cl. 600-36.000.

Ward, Michael J.: *See*—
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Ward, William J.; and Shorthouse, Joanne, to Smith and Nephew Associated Companies, p.l.c. Adhesive dressing for retaining a cannula on the skin. 4,941,882, Cl. 604-180.000.

Watanabe, Hideo, to Fuji Jukogyo Kabushiki Kaisha. Engine brake system of a two-cycle engine for a motor vehicle. 4,941,441, Cl. 123-325.000.

Watanabe, Hirokazu; and Kanzaka, Yoshihiro, to Yoshida Kogyo K. K. Button collet. 4,941,234, Cl. 24-113.0MP.

Watanabe, Hitoshi; Hosaka, Norio; Yuhara, Akitsuna; and Yamada, Jun, to Hitachi, Ltd. Solid state electronic device. 4,942,327, Cl. 310-313.00R.

Watanabe, Junichiro: *See*—
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Watanabe, Kazuhiro; Saito, Kazuya; Yuchi, Yoshiyuki; and Inagawa, Konosuke, to Nihon Sinku Gijutsu Kabusiki Kaisha. Apparatus for forming reactive deposition film. 4,941,430, Cl. 118-723.000.
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Watanabe, Toshinori; Mori, Fumihiko; Nishiyama, Tamotsu; Furihata, Makoto; Kominami, Yasuo; and Horie, Noboru, to Hitachi, Ltd.; and Hitachi Microcomputer Engineering Ltd. Method of automatic circuit translation. 4,942,536, Cl. 364-490.000.
Watanabe, Yoshio; and Chikama, Toshio, to Kabushiki Kaisha Machida Seisakusho. Endoscope having bending means. 4,941,455, Cl. 128-4.000.
Weatherford, James R.; Kimmel, Arthur T.; and Wallach, Steven J., to Convex Computer Corporation. Cache store bypass for computer. 4,942,518, Cl. 364-200.000.
Webasto AG Fahrzeugtechnik: *See*—
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Weber, Robert L.; Kamman, Kenneth R.; Ballheimer, Benny; and Shoup, Stephen G., to Caterpillar Inc. Engine including a piston member having a high top ring groove. 4,941,440, Cl. 123-193.00P.
Weber-Stephen Products Co.: *See*—
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Wecker, Sheldon M.: *See*—
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Wei, Ching-Yeu; Piacente, Patricia A.; and Woodbury, Henry H., to General Electric Company. Fabrication method and structure for field isolation in field effect transistors on integrated circuit chips. 4,942,449, Cl. 357-54.000.
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Weiswurm, Klaus D. Method and apparatus for straightening the pins of a pin grid array. 4,941,516, Cl. 140-147.000.
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Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., 4,941,454, Cl. 128-4.000.
Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., 4,941,456, Cl. 128-6.000.
Wells, Todd A. Air drying air chilling container attachable to a car window. 4,941,602, Cl. 224-42.45R.
Welsh, David E., to ITT Corporation. Electrical connector contact retention system. 4,941,847, Cl. 439-595.000.
Wendler, David C. Electronic pickup with mounting assembly for a hollow bodied musical instrument. 4,941,389, Cl. 84-727.000.
Wendt, Greg A.; Underhill, Kimberly K.; Rugowski, James S.; Kressner, Bernhardt E.; and Chiu, Kai F., to Kimberly-Clark Corporation. Tissue webs having a regular pattern of densified areas. 4,942,077, Cl. 428-152.000.
Wenger, Jean; Winternitz, Paul; and Zeller, Martin, to Hoffmann-La Roche Inc. Heterocyclic compounds. 4,941,909, Cl. 71-92.000.
Wenker, Dennis H.: *See*—
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Western Atlas International, Inc.: *See*—
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Westfall, Norman R., to Caldwell Manufacturing Company. Lift-off shoe system for tilt window. 4,941,285, Cl. 49-176.000.
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Butler, John M., III; and Ponce, Hector O., 4,942,326, Cl. 310-260.000.
Byers, William A., 4,941,958, Cl. 204-183.300.
Hopkins, Brian M., 4,942,463, Cl. 358-96.000.
Wilson, Ian L. W., 4,942,059, Cl. 427-53.100.
Westland Aerostructures Limited: *See*—
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Wheeler, Alton D. Forming multiple exposures on single film sheets, in a film pack. 4,942,412, Cl. 354-125.000.
White, Dwain M.; Socha, Laura A.; and Van Der Meer, Roelof, to General Electric Company. Blends and copolymers of polyetherimide and functionalized polyphenylene ether. 4,942,206, Cl. 525-397.000.
White, Dwain M., to General Electric Company. Method for removing odor components from polyphenylene ether resins with ketone. 4,942,222, Cl. 528-493.000.
White, Robert D.: *See*—
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Whiteside, Frank A.; and Smith, Michael D., to Dallas Semiconductor Corporation. Telecommunications interface with improved jitter reporting. 4,942,593, Cl. 375-118.000.
Whittenberger, William A.; Smith, Edward M.; Alcorn, William R.; and Bullock, Wesley P., to W.R. Grace & Co.-Conn. Converter for removing pollutants from a gas stream. 4,942,020, Cl. 422-180.000.
Wicen, Jan, to Oktan AB. Combustion chamber surfaces of an internal combustion engine. 4,941,439, Cl. 123-193.00P.
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Wickramasinghe, Hemantha K., to International Business Machines Corp. Absorption microscopy and/or spectroscopy with scanning tunneling microscopy control. 4,941,753, Cl. 374-120.000.
Wieringa, Tom, to Carry Companies of Illinois. Device for washing and drying the inside tank of a tanker truck. 4,941,493, Cl. 134-166.00R.
Wiklund, Thomas, to Golf Comback AB. Golf practicing apparatus. 4,941,667, Cl. 273-185.00C.
Wilcox, Richard C.; Allman, James; and Smith, Stacy, to Arvin Industries, Inc. Muffler assembly. 4,941,545, Cl. 181-282.000.
Wild Leitz GmbH: *See*—
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Wilhelm Loh Wetzlar Optikmaschinen GmbH & Co. KG: *See*—
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Wilkie, Brian F.; Goler, Vernon B.; Groves, Stanley E.; and Vaglica, John J., to Motorola, Inc. Timer channel with multiple timer reference features. 4,942,522, Cl. 364-200.000.
Wilkinson, Robert E.; Iseler, Kenneth A.; Smith, Rueben L.; Duerr, Lorenz K. E.; and Cargile, Harry M., to Budd Company, The; and LaRose RF Systems, Inc. Method for bonding FRP members via dielectric heating. 4,941,936, Cl. 156-274.800.
Wilkinson, Robert E.: *See*—
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Wilkinson, Thomas F., to Texas Instruments Incorporated. Semiconductor wafer carrier guide tracks. 4,941,429, Cl. 118-715.000.
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Williams, Anthony G.; and Starkey, David T., to Gulbransen, Incorporated. Method and apparatus for intelligent chord accompaniment. 4,941,387, Cl. 84-609.000.
Williams, Dwight E., to Dow Corning Corporation. Method of making liquid chromatography dual zone packing materials. 4,941,974, Cl. 210-198.200.
Williams, George E.: *See*—
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Williams, Harold R.; and Spencer, Robert M., to Johnson & Johnson Medical, Inc. Fluid injection system. 4,941,518, Cl. 141-1.000.
Williams, Richard T.; and Wu, Jeff C., to AMP Incorporated. Beam allocation and delivery system for excimer laser. 4,941,734, Cl. 350-321.000.
Williams, Wilbur R.; Bornzin, Gene A.; and Thompson, John S., to Spectramed, Inc. Thermodilution by heat exchange. 4,941,475, Cl. 128-692.000.
Williamson, William R. Multi-stage flash evaporator. 4,941,330, Cl. 62-515.000.
Willis, Billy R. Integrated impact detection and alarm system. 4,942,386, Cl. 340-566.000.
Willis, Ronald W.: *See*—
Do, Phuc K.; Kellam, Karen K.; Tong, Ronnie Chi-on; Willis, Ronald W.; and Wyke, Carol E., 4,942,390, Cl. 340-735.000.
Wilsch, Herbert; Huber, Leonhard; Treiber, Helmut; Lermann, Peter; and Nagel, Erich, to AGFA-Gevaert Aktiengesellschaft. Apparatus for storing flexible webs on the cores of takeup reels. 4,941,620, Cl. 242-67.10R.

Wilson, Ian L. W., to Westinghouse Electric Corp. Method for hardfacing metal articles. 4,942,059, Cl. 427-53.100.

Wilts, Gerold: *See*—
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Windham, Terrell D.: *See*—
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Winefordner, James D.; and Jones, Bradley T., to University of Florida, The. Method and apparatus for scientific analysis under low temperature vacuum conditions. 4,942,134, Cl. 436-161.000.

Wing, George S. Process for proofing a threaded joint. 4,941,358, Cl. 73-761.000.

Winkler, Theodore, to Brandt, Inc. Skew-correcting and delay mechanism for sheet feeder. 4,941,655, Cl. 271-242.000.

Winn, Donald G.; and Josephson, Daniel M. Impact and speed measuring system. 4,941,660, Cl. 272-76.000.

Winter, Daryl B.; Meyer, Richard S.; Root, Jeffrey M.; and Campbell, Michael L., to Curtice-Burns, Inc. Process for producing low calorie foods from alkyl glycoside fatty acid polyesters. 4,942,054, Cl. 426-611.000.

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Winyard, David C., to United States of America, Navy. Leakage path interconnection for single screw mechanisms. 4,941,811, Cl. 418-195.000.

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Lipo, Thomas A.; and Murai, Yoshihiro, 4,942,511, Cl. 363-136.000.

Wise, Rodney M., to Procter & Gamble Company, The. Liquid automatic dishwashing compositions having an optimized thickening system. 4,941,988, Cl. 252-99.000.

Witte, James R., to General Electric Company. Fiber optic sensing apparatus for multiplexing a plurality of optical signals of different wavelengths over a single fiber optic cable. 4,942,294, Cl. 250-227.140.

Witten, Donald W. Potted insert for honeycomb panels. 4,941,785, Cl. 411-82.000.

WNM Ventures Inc.: *See*—
Klappert, Walter R.; and McPherson, Alan J., 4,942,551, Cl. 364-900.000.

Wockel, Jurgen: *See*—
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Wojcik, John, to Zip-Pak Incorporated. Zipper guide system for form tooling. 4,941,307, Cl. 53-412.000.

Wolf, Jurgen, to Braun Aktiengesellschaft. Dry shaving apparatus with a short-hair cutter and a slidable longhair trimmer. 4,941,259, Cl. 30-34.100.

Wolfe, Kenneth J.: *See*—
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Wong, Stephen D., to Procor Ltd. Steel end structure for aluminum railcar. 4,941,411, Cl. 105-421.000.

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Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., to Welch Allyn, Inc. Servo actuated steering mechanism for borescope or endoscope. 4,941,454, Cl. 128-4.000.

Wood, Robert J.; Slee, Earl H.; Pasik, Gregory E.; and Pileski, Michael J., to Welch Allyn, Inc. Portable color imager borescope. 4,941,456, Cl. 128-6.000.

Woodbury, Henry H.: *See*—
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Woodward, Thomas R., to Unisys Corporation. Loosely coupled parallel network simulator. 4,942,573, Cl. 370-85.900.

Working, Loren. Carpal brace. 4,941,460, Cl. 128-77.000.

Worsham, Dillard D.; and Worsham, Janet M. Baking oven. 4,942,288, Cl. 219-399.000.

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Worsham, Dillard D.; and Worsham, Janet M., 4,942,288, Cl. 219-399.000.

Wright, James A., to United Technologies Automotive, Inc. Method of electrically interconnecting door components to main power supply in vehicle. 4,941,258, Cl. 29-858.000.

Wu, Huck. Leakage current preventing means for a drier. 4,942,612, Cl. 361-49.000.

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Wu, Tsun-Zong. Lightly-operating automatic umbrella for prevesting false operation. 4,941,494, Cl. 135-20.00M.

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Wurtz, David B. Frame assembly for pickup truck bed cover. 4,941,705, Cl. 296-100.000.

Wyke, Carol E.: *See*—
Do, Phuc K.; Kellam, Karen K.; Tong, Ronnie Chi-on; Willis, Ronald W.; and Wyke, Carol E., 4,942,390, Cl. 340-735.000.

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Yamada, Shinjiro; and Nakamura, Shuji, to Mitsue Kinzoku Kogyo Kabushiki Kaisha. Door lock device for vehicle. 4,941,696, Cl. 292-340.000.

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Yamamuro, Mikio, to Kabushiki Kaisha Toshiba. Signal processing apparatus and method capable of providing precise digital data. 4,942,563, Cl. 369-44.110.

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Yamasaki, Masahiko; Sunaga, Kiyomi; and Nagai, Yoshitaka, to Konica Corporation. Monoclonal antibody and method for preparation of hybridoma producing said antibody. 4,942,131, Cl. 435-240.270.

Yamashita, Teruaki; and Naka, Hirokazu, to Yamaha Hatsudoki Kabushiki Kaisha. Rotary file, support member and abrasive device. 4,941,245, Cl. 29-78.000.

Yamato Scale Company, Limited: *See*—
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Ylvisaker, Jon A. Process for forming a microwave popcorn package. 4,942,050, Cl. 426-394.000.

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Yoshida, Yasunori; Nakayama, Rinichi; and Iwama, Satoshi, to Toyo Tire & Rubber Co., Ltd. Rubber composition for tire tread. 4,942,197, Cl. 524-496.000.

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Yoshimi, Yasuhito, to Dainippon Screen Mfg. Co., Ltd. Processing solution filtering device having a filter in a processing solution container. 4,942,416, Cl. 354-299.000.

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Yu, Robert C. U., to Xerox Corporation. Electrostatographic imaging system. 4,942,105, Cl. 430-59.000.

Yuan, Joseph S.; MacDonald, Richard A.; and Keung, Felix H. N., to Spar Aerospace Limited. Telerobotic tracker. 4,942,538, Cl. 364-513.000.

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Zaromb, Solomon, to United States of America, Energy. Method for preconcentrating a sample for subsequent analysis. 4,942,135, Cl. 436-178.000.

Zaruba, John V., to Marvin Glass & Associates. Town playset. 4,941,859, Cl. 446-476.000.

Zedrosser, Ulrich; and Schwarz, Walter, to Steyr-Daimler-Puch AG. Hand-held automatic firearm. 4,941,394, Cl. 89-129.020.

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Zeevi, Yehoshua Y.; Ar, Ran G.; and Hilsenrath, Oliver, to Technion Research & Development Foundation. Intelligent scan image sensor. 4,942,473, Cl. 358-213.260.

Zeff, Jack D.; and Leitis, Eriks, to Ultrox International. Decomposition of volatile ogranic halogenated compounds contained in gases and aqueous solutions. 4,941,957, Cl. 204-157.300.

Zelle, Bruce R., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Concurrent resource request resolution mechanism. 4,942,574, Cl. 370-85.150.

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Zucchetti, Elia, to Brasilia Srl. Automatic apparatus for the preparation of expresso coffee. 4,941,399, Cl. 99-289.00P.

501 Geonate Holdings Inc.: *See*—
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# LIST OF REISSUE PATENTEES

## TO WHOM

## PATENTS WERE ISSUED ON THE 17TH DAY OF JULY, 1990

NOTE.—Arranged in accordance with the first significant character or word of the name (in accordance with city and telephone directory practice).

American Telephone and Telegraph Company, AT&T Bell Laboratories: *See*—
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Baxley, William H.; Weatherford, Marion H.; Wilfong, Harry B., Jr.; and Williams, Floyd B., to Sonoco Products Company. Bag pack. Re. 33,264, Cl. 206-554.000.

British Petroleum Company p.l.c., The: *See*—
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Dumbri, Austin C., to American Telephone and Telegraph Company, AT&T Bell Laboratories. Folded bit line memory with one decoder per pair of spare rows. Re. 33,266, Cl. 365-200.000.

Foxboro Company, The: *See*—
Kraus, Thomas W., Re. 33,267, Cl. 364-158.000.

Goodman, Steve F., to Herman Miller, Inc. Tamperproof cabinet. Re. 33,263, Cl. 109-50.000.

Grabbe, Dimitry G.; and Korsunsky, Iosif, to AMP Incorporated. Chip carrier socket having improved contact terminals. Re. 33,268, Cl. 439-70.000.

Gregory, James L.; and Wolfe, Steven R., to Owens-Illinois Closure Inc. Tamper-indicating closure, container and combination thereof. Re. 33,265, Cl. 215-252.000.

Grossmann, Walter: *See*—
Link, Helmut F.; and Grossmann, Walter, Re. 33,262, Cl. 82-120.000.

Herman Miller, Inc.: *See*—
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Korsunsky, Iosif: *See*—
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Kraus, Thomas W., to Foxboro Company, The. Pattern-recognizing self-tuning controller. Re. 33,267, Cl. 364-158.000.

Link, Helmut F.; and Grossmann, Walter, to Index Werke Komm.-Ges Hahn & Tessky. Automated turret lathe. Re. 33,262, Cl. 82-120.000.

Owens-Illinois Closure Inc.: *See*—
Gregory, James L.; and Wolfe, Steven R., Re. 33,265, Cl. 215-252.000.

Senez, Alain: *See*—
Thiersault, Jean-Paul; Senez, Alain; and Vidal, Jean L., Re. 33,269, Cl. 525-333.800.

Sonoco Products Company: *See*—
Baxley, William H.; Weatherford, Marion H.; Wilfong, Harry B., Jr.; and Williams, Floyd B., Re. 33,264, Cl. 206-554.000.

Thiersault, Jean-Paul; Senez, Alain; and Vidal, Jean L., to British Petroleum Company p.l.c., The. Process for the treatment of linear low density polyethylene by organic peroxides which generate free radicals. Re. 33,269, Cl. 525-333.800.

Vidal, Jean L.: *See*—
Thiersault, Jean-Paul; Senez, Alain; and Vidal, Jean L., Re. 33,269, Cl. 525-333.800.

Weatherford, Marion H.: *See*—
Baxley, William H.; Weatherford, Marion H.; Wilfong, Harry B., Jr.; and Williams, Floyd B., Re. 33,264, Cl. 206-554.000.

Wilfong, Harry B., Jr.: *See*—
Baxley, William H.; Weatherford, Marion H.; Wilfong, Harry B., Jr.; and Williams, Floyd B., Re. 33,264, Cl. 206-554.000.

Williams, Floyd B.: *See*—
Baxley, William H.; Weatherford, Marion H.; Wilfong, Harry B., Jr.; and Williams, Floyd B., Re. 33,264, Cl. 206-554.000.

Wolfe, Steven R.: *See*—
Gregory, James L.; and Wolfe, Steven R., Re. 33,265, Cl. 215-252.000.

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# LIST OF REEXAMINATION PATENTEES

## TO WHOM

## CERTIFICATES WERE ISSUED

Alldredge, Robert L.; and Deltour, Robert J. Slide conveyor with side stabilizers. B1 4,438,842, 7-17-90, Cl. 198-838.000.

Custom Accessories, Inc.: *See*—
Matthew, Kenneth S.; and Dickey, Harry J., B1 4,264,083, Cl. 280-851.000.

Deltour, Robert J.: *See*—
Alldredge, Robert L.; and Deltour, Robert J., B1 4,438,842, Cl. 198-838.000.

Dickey, Harry J.: *See*—
Matthew, Kenneth S.; and Dickey, Harry J., B1 4,264,083, Cl. 280-851.000.

Hutchinson, Francis G., to Imperial Chemical Industries PLC. Continuous release pharmaceutical compositions. B1 4,767,628, 7-17-90, Cl. 424-426.000.

Imperial Chemical Industries PLC: *See*—
Hutchinson, Francis G., B1 4,767,628, Cl. 424-426.000.

Kawasaki Heavy Industries Ltd: *See*—
Shirai, Tetsuaki, B1 4,537,160, Cl. 123-41.580.

Matthew, Kenneth S.; and Dickey, Harry J., to Custom Accessories, Inc. Splash guard. B1 4,264,083, 7-17-90, Cl. 280-851.000.

Ranallo, Frank N.: *See*—
Zarnstorff, William C.; and Ranallo, Frank N., B1 4,697,280, Cl. 378-207.000.

Shirai, Tetsuaki, to Kawasaki Heavy Industries Ltd. Air cleaner for an air-cooled engine. B1 4,537,160, 7-17-90, Cl. 123-41.580.

Wisconsin Alumni Research Foundation: *See*—
Zarnstorff, William C.; and Ranallo, Frank N., B1 4,697,280, Cl. 378-207.000.

Zarnstorff, William C.; and Ranallo, Frank N., to Wisconsin Alumni Research Foundation. Method and apparatus for the measurement of X-ray sources. B1 4,697,280, 7-17-90, Cl. 378-207.000.

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# LIST OF DESIGN PATENTEES


Alfa Lancia Industriale S.r.l.: *See*—
Giavazzi, Carlo, 309,285, Cl. D12-181.000.

Alfred Grass GES.m.b.H. Metallwarenfabrik: *See*—
Grass, Alfred, 309,247, Cl. D8-323.000.

Allard, Peter B.; Weiss, Michael R.; and Ziegler, David B., to Thermo King Corporation. Cover for a transport refrigeration unit. 309,346, 7-17-90, Cl. D23-325.000.

Allard, Peter B.: *See*—
Anderson, Lowell M.; Tao, Ambrose; Volk, Rodney H.; Allard, Peter B.; and Graser, Clarence F., 309,345, Cl. D23-325.000.

Allsop, Inc.: *See*—
Hoenselaar, John F.; and Clausen, Eivind, 309,216, Cl. D4-114.000.

American Metal Products Company: *See*—
Brown, Douglas S., 309,347, Cl. D23-386.000.

Anderson, Lowell M.; Tao, Ambrose; Volk, Rodney H.; Allard, Peter B.; and Graser, Clarence F., to Thermo King Corporation. Cover for a transport refrigeration unit. 309,345, 7-17-90, Cl. D23-325.000.

APH Road Safety Ltd.: *See*—
Myers, Frank; and Williams, Roger L., 309,273, Cl. D10-113.000.

Appleby, Paul, to Dialatron Limited. Combined clock, radio, telephone. 309,303, 7-17-90, Cl. D14-144.000.

Arai, Tatsuo: *See*—
Tsujimura, Osamu; Arai, Tatsuo; and Okawa, Masayuki, 309,317, Cl. D15-139.000.

Armstrong-Blum Mfg. Co.: *See*—
Collins, Scott J.; Strandell, Timothy B.; and Van Akkeren, John W., 309,316, Cl. D15-134.000.

Autocrat, Inc.: *See*—
Boesel, George F. W., 309,256, Cl. D9-300.000.

Automatic Bar Controls, Inc.: *See*—
Valiyee, Mojtaba; Martindale, William A.; and Martindale, Richard A., 309,232, Cl. D7-398.000.

Auvinen, Jorma: *See*—
Martikainen, Antti; and Auvinen, Jorma, 309,349, Cl. D24-17.000.

Ayyoubi, Luay; and Evans, Travis O. Reclosable funnel fixture. 309,241, 7-17-90, Cl. D7-700.000.

Bakula, Mark S.: *See*—
Cascio, Steven S.; Caldwell, Donald J.; Severson, Tom S.; Wente, Steven R.; and Bakula, Mark S., 309,246, Cl. D8-82.000.

Balfanz-Lee, Vicki. Pacifier coupler for baby's garment. 309,280, 7-17-90, Cl. D11-215.000.

Bausch & Lomb Incorporated: *See*—
Markovitz, Aaron M., 309,263, Cl. D9-432.000.

Beam, Dennis A.: *See*—
Sarazen, Paul M., Jr.; and Beam, Dennis A., 309,348, Cl. D23-387.000.

Bellini, Mario, to Ing. C. Olivetti & C., S.p.A. Printer for typewriter. 309,321, 7-17-90, Cl. D18-13.000.

Bierce, Laurence M.: *See*—
Shaw, Mark D.; Heyman, J. Tad; and Bierce, Laurence M., 309,364, Cl. D34-39.000.

Blom, Lars-Arne: *See*—
Blom, Par-Stephan; and Blom, Lars-Arne, 309,221, Cl. D6-328.000.

Blom, Par-Stephan; and Blom, Lars-Arne, to Scanflex Medical AB. Arm for a hanger unit. 309,221, 7-17-90, Cl. D6-328.000.

Blount, Inc.: *See*—
Chaney, Arlen L., 309,213, Cl. D3-35.000.

BMR Investments, Inc.: *See*—
Larson, Raymond L., 309,231, Cl. D7-313.000.

Boesel, George F. W., to Autocrat, Inc. Liquid dispenser. 309,256, 7-17-90, Cl. D9-300.000.

Bordonaro, Leonard; and Salsky, Jerome. Active eye wear. 309,318, 7-17-90, Cl. D16-112.000.

Breadmont, William T., to Saunders, Roy F.; and Peel, James P., a part interest to each. Spill containment system trough unit with weir flange. 309,341, 7-17-90, Cl. D23-200.000.

Brother Kogyo Kabushiki Kaisha: *See*—
Ishigami, Michifumi, 309,320, Cl. D18-1.000.

Brown, Douglas S., to American Metal Products Company. Damper lever. 309,347, 7-17-90, Cl. D23-386.000.

Business Accounting Computer Services Ltd.: *See*—
Mulherin, Hubert F., 309,230, Cl. D7-673.000.

Caldwell, Donald J.: *See*—
Cascio, Steven S.; Caldwell, Donald J.; Severson, Tom S.; Wente, Steven R.; and Bakula, Mark S., 309,246, Cl. D8-82.000.

Callaghan, Jean D. Book. 309,324, 7-17-90, Cl. D19-26.000.

Canon Kabushiki Kaisha: *See*—
Hirata, Tomohiko; and Ohsawa, Yosuke, 309,322, Cl. D18-40.000.

Capstik Products, Inc.: *See*—
Hasslocher, Robert C., 309,219, Cl. D6-316.000.

Car Mate Manufacturing Company Limited: *See*—
Uchiyama, Seiichi, 309,270, Cl. D10-57.000.

Cascio, Steven S.; Caldwell, Donald J.; Severson, Tom S.; Wente, Steven R.; and Bakula, Mark S., to Snap-on Tools Corporation. Screwdriver. 309,246, 7-17-90, Cl. D8-82.000.

Cass, Michael J. Lounge chair cover. 309,229, 7-17-90, Cl. D6-610.000.

Cassaday, Guy: *See*—
Harder, William A.; and Cassaday, Guy, 309,352, Cl. D27-135.000.

Caterpillar Inc.: *See*—
Grawey, Charles E.; Grob, Robert J.; and Hart, Cullen P., 309,314, Cl. D15-28.000.

Cebal: *See*—
Colonna, Philippe, 309,265, Cl. D9-452.000.

Chaney, Arlen L., to Blount, Inc. Enclosed container. 309,213, 7-17-90, Cl. D3-35.000.

Chapman, Edwin H. Game ball projector. 309,327, 7-17-90, Cl. D21-2.000.

Chemler, Susan W. S., to Continental Plastic Containers, Inc. Container body for liquids or the like. 309,259, 7-17-90, Cl. D9-376.000.

Cheng, Shiu C. Spoon. 309,236, 7-17-90, Cl. D7-647.000.

Christian Dior, S.A.: *See*—
Saurer, Hans, 309,267, Cl. D10-39.000.

Clausen, Eivind: *See*—
Hoenselaar, John F.; and Clausen, Eivind, 309,216, Cl. D4-114.000.

Coiner, Charles B. Display carton. 309,262, 7-17-90, Cl. D9-418.000.

Cole & Mason Limited: *See*—
Griffin, Anthony H., 309,240, Cl. D7-679.000.

Coleman Outdoor Products, Inc.: *See*—
Deines, Robert R.; and Steffes, William J., 309,239, Cl. D7-605.000.

Collins, Scott J.; Strandell, Timothy B.; and Van Akkeren, John W., to Armstrong-Blum Mfg. Co. Band saw. 309,316, 7-17-90, Cl. D15-134.000.

Collyer, Robert C. Clothespin. 309,361, 7-17-90, Cl. D32-62.000.

Colonna, Philippe, to Cebal. Bottle cap. 309,265, 7-17-90, Cl. D9-452.000.

Conair Corporation: *See*—
Rizzuto, Leandro P.; Leung, Kit-Lun; and Lo, Hou-On, 309,354, Cl. D28-35.000.

Conopco, Inc.: *See*—
Rosen, Marc A., 309,357, Cl. D28-77.000.

Conrad, George R., to General Electric Company. Bottle. 309,260, 7-17-90, Cl. D9-378.000.

Continental Plastic Containers, Inc.: *See*—
Chemler, Susan W. S., 309,259, Cl. D9-376.000.

Craft, James A.; Freeman, William D.; Molloy, James J.; Shadwick, David T.; Twardeck, Thomas G.; and Wang, James P., to International Business Machines Corporation. Cartridge for an electrophotographic printer. 309,323, 7-17-90, Cl. D18-40.000.

Crowley, Joseph. Product display mounting bracket for providing price tags or coded inventory labels. 309,249, 7-17-90, Cl. D8-354.000.

Crowley, Joseph. Clip strip for displaying bagged products. 309,252, 7-17-90, Cl. D8-373.000.

Daiwa Seiko, Inc.: *See*—
Kameda, Yasuhisa; and Yoshikawa, Toshiaki, 309,340, Cl. D22-141.000.

de la Huerga, Carlos; Roberts, Todd N.; Salimes, Christopher J.; and Tennessen, John P., to Marquette Electronics, Inc. Data terminal. 309,295, 7-17-90, Cl. D14-100.000.

Deines, Robert R.; and Steffes, William J., to Coleman Outdoor Products, Inc. Picnic cooler. 309,239, 7-17-90, Cl. D7-605.000.

Dialatron Limited: *See*—
Appleby, Paul, 309,303, Cl. D14-144.000.

Dickson, Douglas M., to Ericsson GE Mobile Communications Inc. Front cover for cellular portable telephone. 309,302, 7-17-90, Cl. D14-138.000.

Doebler, Richard J. Seat bracket holder for self-contained breathing cylinder. 309,253, 7-17-90, Cl. D8-373.000.

Dylewski, Eugene A., II: *See*—
Tisten, George J.; Wilson, Donald J.; and Dylewski, Eugene A., II, 309,281, Cl. D12-99.000.

Ecodyne Corporation: *See*—
Nowlin, Duane D.; Nelson, John R.; and Wilker, Christopher M., 309,342, Cl. D23-239.000.

Endo, Takayoshi; Yagi, Saksi; and Yamada, Satoshi, to Yazaki Corp. Housing for an electrical connector. 309,289, 7-17-90, Cl. D13-147.000.

Enersaver Products, Inc.: *See*—
Sundheim, Gregory S.; and Sundheim, Jchn M., 309,309, Cl. D15-13.000.

Envall, Bjorn E. A.; and Giugiaro, Giorgetto, to Saab-Scania Aktiebolag. Left front door for an automobile. 309,287, 7-17-90, Cl. D12-196.000.

Ericsson GE Mobile Communications Inc.: *See*—
Dickson, Douglas M., 309,302, Cl. D14-138.000.

Esef Corporation: *See*—
Shaw, Mark D.; Heyman, J. Tad; and Bierce, Laurence M., 309,364, Cl. D34-39.000.

Evans, Travis O.: *See*—
Ayyoubi, Luay; and Evans, Travis O., 309,241, Cl. D7-700.000.

Falcor Group Inc.: *See*—
Lipman, Leonard H., 309,238, Cl. D7-605.000.

Flood, David T.; and Udelhofen, Mark J., to Illinois Tools Works Inc. Bi-directional lashing patch. 309,250, 7-17-90, Cl. D8-356.000.

Forbes, Hampton E., Jr., to Westvaco Corporation. Lid for ovenable tray. 309,264, 7-17-90, Cl. D9-438.000.

Foster, Billy J. Space alien doll. 309,333, 7-17-90, Cl. D21-166.000.

Freeman, William D.: *See*—
Craft, James A.; Freeman, William D.; Molloy, James J.; Shadwick, David T.; Twardeck, Thomas G.; and Wang, James P., 309,323, Cl. D18-40.000.

Friedman, Jay M., to Palm Beach Incorporated. Display clip for attachment to the waistband of trousers for displaying size of garment and other information. 309,326, 7-17-90, Cl. D20-43.000.

Fushiya, Fusao; Yamazaki, Takashi; Ito, Katsuyasu; and Ohashi, Matsuo, to Makita Electric Works, Ltd. Lawn mower. 309,310, 7-17-90, Cl. D15-14.000.

General Electric Company: *See—*
Conrad, George R., 309,260, Cl. D9-378.000.
Newmark, Larry J.; and Hibbert, David A., 309,290, Cl. D13-169.000.

Gerald E. Palmer Enterprises: *See—*
Palmer, Gerald E., 309,251, Cl. D8-367.000.

Giannelli, Giuseppe, to Micromax S.p.A. Flatiron. 309,362, 7-17-90, Cl. D32-70.000.

Giavazzi, Carlo, to Alfa Lancia Industriale S.r.l. Three piece spoiler unit for attachment to the rear of a vehicle. 309,285, 7-17-90, Cl. D12-181.000.

Gillette Company, The: *See—*
Shurtleff, Jill M., 309,355, Cl. D28-48.000.

Giugiaro, Giorgetto: *See—*
Eavall, Bjorn E. A.; and Giugiaro, Giorgetto, 309,287, Cl. D12-196.000.

Gold Star Co., Ltd.: *See—*
Oh, Woo Y., 309,299, Cl. D14-109.000.

Graser, Clarence F.: *See—*
Andersen, Lowell M.; Tao, Ambrose; Volk, Rodney H.; Allard, Peter B.; and Graser, Clarence F., 309,345, Cl. D23-325.000.

Grass, Alfred, to Alfred Grass GES.m.b.H. Metallwarenfabrik. Hinge with protective cover therefor. 309,247, 7-17-90, Cl. D8-323.000.

Grawey, Charles E.; Grob, Robert J.; and Hart, Cullen P., to Caterpillar Inc. Endless belt for a belted vehicle. 309,314, 7-17-90, Cl. D15-28.000.

Gray, Russell C. Whistle. 309,274, 7-17-90, Cl. D10-119.000.

Great Plains Industries, Inc.: *See—*
Hall, Robert E., 309,272, Cl. D10-96.000.

Greenspoon, Michael. Headless tambourine. 309,319, 7-17-90, Cl. D17-22.000.

Griffard, John D. Barbeque attachment grid for cooking seafood. 309,235, 7-17-90, Cl. D7-409.000.

Griffin, Anthony H., to Cole & Mason Limited. Condiment grinder. 309,240, 7-17-90, Cl. D7-679.000.

Grob, Robert J.: *See—*
Grawey, Charles E.; Grob, Robert J.; and Hart, Cullen P., 309,314, Cl. D15-28.000.

Guile, Henry B. O., to Oscar Investments Pty. Limited. Roller wheel. 309,254, 7-17-90, Cl. D8-375.000.

Hall, Robert E., to Great Plains Industries, Inc. Flow meter. 309,272, 7-17-90, Cl. D10-96.000.

Halls, Christine. Kit for teaching color coordination. 309,325, 7-17-90, Cl. D19-62.000.

Har-Col Enterprises, Inc.: *See—*
Harder, William A.; and Cassaday, Guy, 309,352, Cl. D27-135.000.

Harder, William A.; and Cassaday, Guy, to Har-Col Enterprises, Inc. Ashtray. 309,352, 7-17-90, Cl. D27-135.000.

Harper-Wyman Company: *See—*
Lund, Lyle B., 309,233, Cl. D7-407.000.

Hart, Cullen P.: *See—*
Grawey, Charles E.; Grob, Robert J.; and Hart, Cullen P., 309,314, Cl. D15-28.000.

Hasegawa, Yoshihiko, to Sumitomo Rubber Industries, Ltd. Automobile tire. 309,282, 7-17-90, Cl. D12-146.000.

Hasegawa, Yoshihiko, to Sumitomo Rubber Industries, Ltd. Automobile tire. 309,286, 7-17-90, Cl. D12-149.000.

Hass, Robert W. Caster arm for a mowing machine. 309,312, 7-17-90, Cl. D15-17.000.

Hasslocher, Robert C., to Capstik Products, Inc. Cap holder. 309,219, 7-17-90, Cl. D6-316.000.

Haugland, Richard M. Luggage container vehicle accessory. 309,214, 7-17-90, Cl. D3-40.000.

Haverly, Paul W., to Onan Corporation. Generator set enclosure. 309,288, 7-17-90, Cl. D13-114.000.

Helbig, Arthur L., Jr. Pocket data input/output terminal. 309,293, 7-17-90, Cl. D14-100.000.

Her, Ming-Long. Combined compact brush and comb. 309,217, 7-17-90, Cl. D4-116.000.

Heyman, J. Tad: *See—*
Shaw, Mark D.; Heyman, J. Tad; and Bierce, Laurence M., 309,364, Cl. D34-39.000.

Hibbert, David A.: *See—*
Newmark, Larry J.; and Hibbert, David A., 309,290, Cl. D13-169.000.

Hirata, Tomohiko; and Ohsawa, Yosuke, to Canon Kabushiki Kaisha. Editing device for copying machine. 309,322, 7-17-90, Cl. D18-40.000.

Hoenselaar, John F.; and Clausen, Eivind, to Allsop, Inc. Bicycle sprocket cleaner. 309,216, 7-17-90, Cl. D4-114.000.

Holiday Rambler Corporation: *See—*
Tisten, George J.; Wilson, Donald J.; and Dylewski, Eugene A., II, 309,281, Cl. D12-99.000.

Howell, Jack D. Cooking pad. 309,234, 7-17-90, Cl. D7-409.000.

Igarashi, Yasuo, to Sumitomo Rubber Industries, Ltd. Automobile tire. 309,283, 7-17-90, Cl. D12-148.000.

Illinois Tools Works Inc.: *See—*
Flood, David T.; and Udelhofen, Mark J., 309,250, Cl. D8-356.000.

Ing. C. Olivetti & C., S.p.A.: *See—*
Bellini, Mario, 309,321, Cl. D18-13.000.
Sottsass, Ettore, 309,294, Cl. D14-100.000.

Instrumentarium Corp.: *See—*
Martikainen, Antti; and Auvinen, Jorma, 309,349, Cl. D24-17.000.

Interlego A.G.: *See—*
Olsen, Flemming H., 309,332, Cl. D21-108.000.

International Business Machines Corporation: *See—*
Craft, James A.; Freeman, William D.; Molloy, James J.; Shadwick, David T.; Twardeck, Thomas G.; and Wang, James P., 309,323, Cl. D18-40.000.

Ishigami, Michifumi, to Brother Kogyo Kabushiki Kaisha. Word processor. 309,320, 7-17-90, Cl. D18-1.000.

Italiano, Frank T., Jr. Talking police officer figure. 309,334, 7-17-90, Cl. D21-178.000.

Ito, Katsuyasu: *See—*
Fushiya, Fusao; Yamazaki, Takashi; Ito, Katsuyasu; and Ohashi, Matsuo, 309,310, Cl. D15-14.000.

Japan Oxygen Co., Ltd.: *See—*
Kobayashi, Ikuo; and Kitamura, Nobuyuki, 309,237, Cl. D7-605.000.

Joachim, Barry L. Child safety harness. 309,359, 7-17-90, Cl. D29-11.000.

Johns, Joseph F. Hand rest. 309,356, 7-17-90, Cl. D28-56.000.

Jones, Dallas W.; Young, Lauren J.; and Orr, Matthew F., to Trim-A-Lawn Corporation. Lawn mower housing or the like. 309,311, 7-17-90, Cl. D15-17.000.

Kameda, Yasuhisa; and Yoshikawa, Toshiaki, to Daiwa Seiko, Inc. Fishing reel. 309,340, 7-17-90, Cl. D22-141.000.

Kaneko, Ryoichi, to Seikosha Co., Ltd. Clock. 309,266, 7-17-90, Cl. D10-6.000.

Karow, Harold E., Jr. Detachable flashlight mount for firearms or similar article. 309,255, 7-17-90, Cl. D8-395.000.

Katoh, Hisato: *See—*
Takashima, Akira; Shimoie, Shizuo; and Katoh, Hisato, 309,313, Cl. D15-25.000.

Keyes Fibre: *See—*
Vigue, Henry R., 309,258, Cl. D9-341.000.

Kida, Kenichi, to Terumo Kabushiki Kaisha. Probe for electronic clinical thermometer. 309,271, 7-17-90, Cl. D10-57.000.

Kitamura, Nobuyuki: *See—*
Kobayashi, Ikuo; and Kitamura, Nobuyuki, 309,237, Cl. D7-605.000.

Kobayashi, Ikuo; and Kitamura, Nobuyuki, to Japan Oxygen Co., Ltd. Vacuum bottle. 309,237, 7-17-90, Cl. D7-605.000.

Kobayashi, Toyohiro: *See—*
Wada, Seiji; Otsuka, Nobuo; Kobayashi, Toyohiro; and Thompson, Peter, 309,268, Cl. D10-50.000.

Kohler, Robert, to Societe D'Applications Generales D'Electricite. Credit card terminal with auxiliary keyboard. 309,296, 7-17-90, Cl. D14-105.000.

Kouns, Marjorie K. Jewelry chain. 309,275, 7-17-90, Cl. D11-11.000.

Koza, Coleman L.; and Koza, Lawrence J. Louver gasket. 309,343, 7-17-90, Cl. D23-269.000.

Koza, Lawrence J.: *See—*
Koza, Coleman L.; and Koza, Lawrence J., 309,343, Cl. D23-269.000.

Kubota, Ltd.: *See—*
Takashima, Akira; Shimoie, Shizuo; and Katoh, Hisato, 309,313, Cl. D15-25.000.

Larson, Raymond L., to BMR Investments, Inc. Combined water dispenser and container. 309,231, 7-17-90, Cl. D7-313.000.

Laslo, Joseph W. Ground aerator. 309,242, 7-17-90, Cl. D8-6.000.

Leung, Donny, to Video Technology Industries, Inc. Electronic game housing. 309,331, 7-17-90, Cl. D21-13.000.

Leung, Kit-Lun: *See—*
Rizzuto, Leandro P.; Leung, Kit-Lun; and Lo, Hou-On, 309,354, Cl. D28-35.000.

Lindgren, Everett L., Jr. Portable computer keyboard support. 309,300, 7-17-90, Cl. D14-114.000.

Lipman, Leonard H., to Falcor Group Inc. Combined beverage cooler and dispenser. 309,238, 7-17-90, Cl. D7-605.000.

Liu, LiFong: *See—*
Maletsky, Jerry; and Liu, LiFong, 309,212, Cl. D2-602.000.

Lo, Hou-On: *See—*
Rizzuto, Leandro P.; Leung, Kit-Lun; and Lo, Hou-On, 309,354, Cl. D28-35.000.

Lubke, Karl, to Lubke Mobelwerke GmbH & Co. KG. Chair. 309,222, 7-17-90, Cl. D6-366.000.

Lubke, Karl, to Lubke Mobelwerke GmbH & Co. KG. Chair. 309,223, 7-17-90, Cl. D6-373.000.

Lubke Mobelwerke GmbH & Co. KG.: *See—*
Lubke, Karl, 309,222, Cl. D6-366.000.
Lubke, Karl, 309,223, Cl. D6-373.000.

Lumbert, David E.: *See—*
Ratch, Herbert R.; Ratch, Margo B.; and Lumbert, David E., 309,344, Cl. D23-323.000.

Lund, Lyle B., to Harper-Wyman Company. Cap for a gas burner. 309,233, 7-17-90, Cl. D7-407.000.

Lutfy, Eric A. Solid projectiles. 309,339, 7-17-90, Cl. D22-116.000.

MacFarlane, Walter J., to Stanley Works, The. Hasp-type latch. 309,248, 7-17-90, Cl. D8-338.000.

Machelett, Dietrich: *See—*
Machelett, Reinhard; and Machelett, Dietrich, 309,358, Cl. D28-78.000.

Machelett, Reinhard; and Machelett, Dietrich, to Wilheim Koopman KG. Cosmetic compact. 309,358, 7-17-90, Cl. D28-78.000.

Maina, Bruno, to Roj Electrotex S.p.A. Yarn feeder for textile machines. 309,315, 7-17-90, Cl. D15-78.000.

Makita Electric Works, Ltd.: *See—*
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|---|---|
| 1.2 | 4,941,244 |
| 25.35 | 4,941,243 |
| 78 | 4,941,245 |
| | 4,941,246 |
| 116.1 | 4,941,250 |
| 116.2 | 4,941,247 |
| 132 | 4,941,251 |
| 261 | 4,941,252 |
| 273 | 4,941,253 |
| 564.6 | 4,941,248 |
| 611 | 4,941,249 |
| 622 | 4,941,254 |
| 833 | 4,941,255 |
| | 4,941,256 |
| 840 | 4,941,257 |
| 858 | 4,941,258 |

### CLASS 30

| | |
|---|---|
| 34.1 | 4,941,259 |
| 162 | 4,941,260 |
| 296.1 | 4,941,261 |
| 419 | 4,941,262 |

### CLASS 33

| | |
|---|---|
| 264 | 4,941,263 |
| 457 | 4,941,264 |
| 504 | 4,941,265 |
| 556 | 4,941,266 |
| 700 | 4,941,267 |
| 729 | 4,941,268 |
| 783 | 4,941,269 |

### CLASS 34

| | |
|---|---|
| 60 | 4,941,270 |

### CLASS 36

| | |
|---|---|
| 2.6 | 4,941,271 |
| 91 | 4,941,272 |
| 114 | 4,941,273 |
| 117 | 4,941,274 |

### CLASS 37

| | |
|---|---|
| 219 | 4,941,275 |

### CLASS 40

| | |
|---|---|
| 538 | 4,941,276 |

### CLASS 42

| | |
|---|---|
| 100 | 4,941,277 |

### CLASS 43

| | |
|---|---|
| 15 | 4,941,278 |
| 42.22 | 4,941,279 |
| 42.36 | 4,941,280 |
| 43.12 | 4,941,281 |

### CLASS 44

| | |
|---|---|
| 541 | 4,941,888 |
| 590 | 4,941,889 |

### CLASS 47

| | |
|---|---|
| 58 | 4,941,282 |
| 67 | 4,941,283 |

### CLASS 48

| | |
|---|---|
| 197 R | 4,941,890 |

### CLASS 49

| | |
|---|---|
| 49 | 4,941,284 |
| 176 | 4,941,285 |
| 352 | 4,941,286 |
| 455 | 4,941,287 |
| 504 | 4,941,288 |
| | 4,941,289 |

### CLASS 51

| | |
|---|---|
| 74 R | 4,941,290 |
| 105 L G | 4,941,291 |
| 168 | 4,941,292 |
| | 4,941,293 |
| 293 | 4,941,891 |
| 309 | 4,941,892 |
| 328 | 4,941,294 |
| 425 | 4,941,295 |
| 433 | 4,941,296 |
| 434 | 4,941,297 |
| 438 | 4,941,298 |

### CLASS 52

| | |
|---|---|
| 12 | 4,941,299 |
| 58 | 4,941,300 |
| 102 | 4,941,301 |
| 171 | 4,941,302 |
| 223 L | 4,941,303 |
| 514 | 4,941,305 |
| 580 | 4,941,304 |

### CLASS 53

| | |
|---|---|
| 306 | 4,941,306 |
| 412 | 4,941,307 |
| 425 | 4,941,308 |
| 512 | 4,941,310 |
| 544 | 4,941,309 |
| 587 | 4,941,311 |

### CLASS 54

| | |
|---|---|
| 8 | 4,941,312 |
| 24 | 4,941,313 |

### CLASS 55

| | |
|---|---|
| 16 | 4,941,893 |
| 20 | 4,941,894 |
| 84 | 4,941,895 |
| 95 | 4,941,896 |
| 158 | 4,941,897 |
| 230 | 4,941,898 |
| 270 | 4,941,899 |
| 319 | 4,941,900 |

### CLASS 57

| | |
|---|---|
| 299 | 4,941,314 |

### CLASS 59

| | |
|---|---|
| 78 | 4,941,315 |
| | 4,941,316 |

### CLASS 60

| | |
|---|---|
| 39.093 | 4,941,317 |
| 274 | 4,941,318 |
| 314 | 4,941,319 |
| 437 | 4,941,320 |
| 468 | 4,941,321 |
| 547.1 | 4,941,322 |
| 589 | 4,941,323 |

### CLASS 62

| | |
|---|---|
| 94 | 4,941,324 |
| 158 | 4,941,325 |
| 180 | 4,941,326 |
| 246 | 4,941,327 |
| 262 | 4,941,901 |
| 294 | 4,941,328 |
| 476 | 4,941,329 |
| 515 | 4,941,330 |
| 532 | 4,941,902 |

### CLASS 65

| | |
|---|---|
| 1 | 4,941,903 |
| | 4,941,904 |
| 3.12 | 4,941,905 |
| 29 | 4,941,906 |
| 66 | 4,941,907 |

### CLASS 66

| | |
|---|---|
| 25 | 4,941,331 |
| 104 | 4,941,332 |

### CLASS 68

| | |
|---|---|
| 19.2 | 4,941,333 |

### CLASS 70

| | |
|---|---|
| 214 | 4,941,334 |
| 365 | 4,941,336 |
| 458 | 4,941,335 |

### CLASS 71

| | |
|---|---|
| 89 | 4,941,908 |
| 92 | 4,941,909 |
| | 4,941,910 |
| | 4,941,911 |
| | 4,941,912 |

### CLASS 72

| | |
|---|---|
| 88 | 4,941,337 |
| 151 | 4,941,338 |
| 189 | 4,941,339 |
| 379.2 | 4,941,340 |
| 402 | 4,941,341 |
| | 4,941,342 |
| 447 | 4,941,343 |
| 456 | 4,941,344 |

### CLASS 73

| | |
|---|---|
| 23.2 | 4,941,345 |
| 54 | 4,941,346 |
| 116 | 4,941,347 |
| 119 A | 4,941,348 |
| 151 | 4,941,349 |
| 155 | 4,941,350 |
| 431 | 4,941,351 |
| 461 | 4,941,352 |
| 505 | 4,941,353 |
| 517 B | 4,941,354 |
| 517 R | 4,941,355 |
| 587 | 4,941,356 |
| 600 | 4,941,357 |
| 761 | 4,941,358 |
| 851 | 4,941,359 |
| 861.24 | 4,941,361 |
| 862.23 | 4,941,362 |
| 862.33 | 4,941,363 |
| 864.34 | 4,941,360 |
| 864.53 | 4,941,364 |
| 865 | 4,941,365 |

### CLASS 74

| | |
|---|---|
| 6 | 4,941,366 |
| 53 | 4,941,367 |
| 527 | 4,941,368 |
| 551.9 | 4,941,369 |
| 865 | 4,941,371 |
| 878 | 4,941,372 |

### CLASS 75

| | |
|---|---|
| 10.12 | 4,941,916 |
| 229 | 4,941,918 |
| 235 | 4,941,919 |
| 246 | 4,941,920 |
| 309 | 4,941,914 |
| 537 | 4,941,913 |
| 744 | 4,941,917 |

### CLASS 81

| | |
|---|---|
| 3.4 | 4,941,373 |

### CLASS 82

| | |
|---|---|
| 120 | Re.33,262 |

### CLASS 83

| | |
|---|---|
| 13 | 4,941,374 |
| 23 | 4,941,375 |
| 100 | 4,941,376 |
| 211 | 4,941,377 |
| 350 | 4,941,378 |
| 409.2 | 4,941,379 |
| 455 | 4,941,380 |
| 468.94 | 4,941,381 |
| 713 | 4,941,382 |

### CLASS 84

| | |
|---|---|
| 275 | 4,941,383 |
| 313 | 4,941,384 |
| 383 R | 4,941,385 |
| 410 | 4,941,386 |
| 609 | 4,941,387 |
| 726 | 4,941,388 |
| 727 | 4,941,389 |

### CLASS 89

| | |
|---|---|
| 1.14 | 4,941,391 |
| 1.51 | 4,941,392 |
| 7 | 4,941,390 |
| 35.01 | 4,941,393 |
| 129.02 | 4,941,394 |

### CLASS 92

| | |
|---|---|
| 57 | 4,941,395 |
| 136 | 4,941,396 |
| 223 | 4,941,397 |

### CLASS 98

| | |
|---|---|
| 2 | 4,941,398 |

### CLASS 99

| | |
|---|---|
| 289 P | 4,941,399 |
| 403 | 4,941,400 |
| 446 | 4,941,401 |
| 450.6 | 4,941,402 |
| 492 | 4,941,403 |

### CLASS 100

| | |
|---|---|
| 117 | 4,941,404 |

### CLASS 101

| | |
|---|---|
| 93.04 | 4,941,405 |

### CLASS 104

| | |
|---|---|
| 23.1 | 4,941,406 |
| 289 | 4,941,407 |

### CLASS 105

| | |
|---|---|
| 72.2 | 4,941,408 |
| 157.1 | 4,941,409 |
| 358 | 4,941,410 |
| 421 | 4,941,411 |

### CLASS 106

| | |
|---|---|
| 213 | 4,941,921 |
| 214 | 4,941,922 |
| 498 | 4,941,923 |
| 900 | 4,941,924 |

### CLASS 108

| | |
|---|---|
| 156 | 4,941,412 |
| 157 | 4,941,413 |

### CLASS 109

| | |
|---|---|
| 50 | Re.33,263 |

### CLASS 110

| | |
|---|---|
| 108 | 4,941,414 |
| 235 | 4,941,415 |

### CLASS 111

| | |
|---|---|
| 102 | 4,941,416 |

### CLASS 112

| | |
|---|---|
| 142 | 4,941,417 |
| 304 | 4,941,418 |

### CLASS 114

| | |
|---|---|
| 61 | 4,941,419 |
| 102 | 4,941,420 |
| 144 R | 4,941,421 |
| 203 | 4,941,422 |
| 289 | 4,941,423 |

### CLASS 116

| | |
|---|---|
| 85 | 4,941,424 |
| 217 | 4,941,425 |

### CLASS 118

| | |
|---|---|
| 52 | 4,941,426 |
| 326 | 4,941,427 |
| 680 | 4,941,428 |
| 715 | 4,941,429 |
| 723 | 4,941,430 |

### CLASS 119

| | |
|---|---|
| 1 | 4,941,431 |
| 3 | 4,941,432 |
| 14.02 | 4,941,433 |
| 109 | 4,941,434 |

### CLASS 122

| | |
|---|---|
| 382 | 4,941,435 |

### CLASS 123

| | |
|---|---|
| 41.12 | 4,941,437 |
| 41.58 | B1 4,537,160 |
| 41.77 | 4,941,438 |
| 90.46 | 4,941,438 |
| 193 P | 4,941,439 |
| | 4,941,440 |
| 325 | 4,941,441 |
| 333 | 4,941,442 |
| 376 | 4,941,443 |
| 399 | 4,941,444 |
| 414 | 4,941,445 |
| | 4,941,446 |
| 455 | 4,941,447 |
| 488 | 4,941,448 |
| 490 | 4,941,449 |
| 633 | 4,941,450 |

### CLASS 126

| | |
|---|---|
| 77 | 4,941,451 |
| 110 R | 4,941,452 |

### CLASS 128

| | |
|---|---|
| 4 | 4,941,454 |
| | 4,941,455 |
| 6 | 4,941,456 |
| | 4,941,457 |
| 64 | 4,941,458 |
| 66 | 4,941,459 |
| 77 | 4,941,460 |
| 79 | 4,941,461 |
| 80 C | 4,941,462 |
| 83 | 4,941,463 |
| 84 R | 4,941,464 |
| 87 R | 4,941,465 |
| 203.12 | 4,941,467 |
| 204.26 | 4,941,468 |
| 205.18 | 4,941,469 |
| 206.13 | 4,941,470 |
| 419 PG | 4,941,471 |
| 419 PS | 4,941,472 |
| 637 | 4,941,473 |
| 660.01 | 4,941,474 |
| 692 | 4,941,475 |
| 719 | 4,941,476 |
| 731 | 4,941,477 |
| 848 | 4,941,478 |
| 877 | 4,941,479 |
| 878 | 4,941,480 |

### CLASS 131

| | |
|---|---|
| 84.4 | 4,941,482 |
| 194 | 4,941,483 |
| 297 | 4,941,484 |
| 365 | 4,941,485 |
| | 4,941,486 |

### CLASS 132

| | |
|---|---|
| 323 | 4,941,487 |
| | 4,941,488 |

### CLASS 134

| | |
|---|---|
| 3 | 4,941,925 |
| 22.19 | 4,941,926 |
| 95 | 4,941,489 |
| 98 | 4,941,490 |
| 111 | 4,941,491 |
| 166 R | 4,941,493 |
| 182 | 4,941,492 |

### CLASS 135

| | |
|---|---|
| 20 M | 4,941,494 |
| 65 | 4,941,495 |
| 67 | 4,941,496 |
| | 4,941,497 |
| 68 | 4,941,498 |
| 104 | 4,941,499 |
| 106 | 4,941,500 |

### CLASS 137

| | |
|---|---|
| 78.3 | 4,941,501 |
| 116 | 4,941,502 |
| 454.2 | 4,941,503 |
| 524 | 4,941,504 |
| 563 | 4,941,505 |
| 625.17 | 4,941,509 |
| 625.37 | 4,941,507 |
| 625.4 | 4,941,506 |
| 625.69 | 4,941,508 |
| 627.5 | 4,941,510 |

### CLASS 138

| | |
|---|---|
| 89 | 4,941,511 |
| 97 | 4,941,512 |

### CLASS 139

| | |
|---|---|
| 116.2 | 4,941,513 |
| 383 A | 4,941,514 |

### CLASS 140

| | |
|---|---|
| 119 | 4,941,515 |
| 147 | 4,941,516 |

### CLASS 141

| | |
|---|---|
| 1 | 4,941,517 |
| | 4,941,518 |
| 22 | 4,941,519 |
| 114 | 4,941,520 |

### CLASS 144

| | |
|---|---|
| 347 | 4,941,521 |

### CLASS 148

| | |
|---|---|
| 2 | 4,941,928 |
| 11.5 Q | 4,941,927 |
| 24 | 4,941,929 |
| 260 | 4,941,930 |

### CLASS 149

| | |
|---|---|
| 19.2 | 4,941,931 |

### CLASS 152

| | |
|---|---|
| 523 | 4,941,522 |
| 543 | 4,941,523 |

### CLASS 156

| | |
|---|---|
| 48 | 4,941,932 |
| 160 | 4,941,933 |
| 195 | 4,941,934 |
| 243 | 4,941,935 |
| 274.8 | 4,941,936 |
| | 4,941,937 |
| 281 | 4,941,938 |
| 495 | 4,941,939 |
| 628 | 4,941,940 |
| 647 | 4,941,941 |
| 657 | 4,941,942 |

### CLASS 160

| | |
|---|---|
| 67 | 4,941,524 |

### CLASS 162

| | |
|---|---|
| 9 | 4,941,943 |
| 19 | 4,941,944 |
| 29 | 4,941,945 |
| 36 | 4,941,946 |
| 103 | 4,941,947 |
| 142 | 4,941,948 |
| 310 | 4,941,949 |
| 343 | 4,941,950 |

### CLASS 165

| | |
|---|---|
| 12 | 4,941,525 |
| 32 | 4,941,526 |
| 47 | 4,941,527 |
| 56 | 4,941,528 |
| 94 | 4,941,529 |
| 104.33 | 4,941,530 |
| 125 | 4,941,531 |

### CLASS 166

| | |
|---|---|
| 216 | 4,941,532 |
| 252 | 4,941,533 |
| 285 | 4,941,534 |
| | 4,941,535 |
| 293 | 4,941,536 |
| 308 | 4,941,537 |

### CLASS 170

| | |
|---|---|
| 329 | 4,941,538 |

**CLASS 174**

93 4,942,270
101 4,942,271

**CLASS 175**

48 4,941,951

**CLASS 180**

22 4,941,539
65.1 4,941,540
140 4,941,541
4,941,542
254 4,941,543
292 4,941,544

**CLASS 181**

282 4,941,545

**CLASS 182**

17 4,941,546
107 4,941,547
234 4,941,548
4,941,549

**CLASS 184**

5.1 4,941,550
106 4,941,551

**CLASS 188**

1.12 4,941,552
156 4,941,553
310 4,941,554

**CLASS 191**

14 4,941,555

**CLASS 192**

0.062 4,941,556
70.25 4,941,557
107 C 4,941,558
107 R 4,941,559

**CLASS 194**

250 4,941,560

**CLASS 198**

365 4,941,561
416 4,941,562
465.3 4,941,563
468.2 4,941,564
601 4,941,565
778 4,941,566
4,941,567
838 B1 4,438,842
853 4,941,568

**CLASS 200**

43.16 4,942,272
61.54 4,942,273
84 C 4,942,274
308 4,942,275
517 4,942,276

**CLASS 201**

1 4,941,952

**CLASS 204**

59 R 4,941,954
129.5 4,941,955
157.2 4,941,956
157.3 4,941,957
183.3 4,941,958
186 4,941,959
213 4,941,960
294 4,941,961
298.12 4,941,915
302 4,941,962
541 4,941,953

**CLASS 206**

38.1 4,941,569
267 4,941,570
378 4,941,571
423 4,941,572
459 4,941,573
466 4,941,574
554 Re.33,264
621.3 4,941,575

**CLASS 208**

46 4,941,963
108 4,941,965
112 4,941,966
184 4,941,967
216 PP 4,941,964
236 4,941,968

**CLASS 209**

39 4,941,969
234 4,941,970

**CLASS 210**

107 4,941,971
175 4,941,973
198.2 4,941,974
232 4,941,975
490 4,941,972
4,941,976
521 4,941,977
693 4,941,978
697 4,941,979

**CLASS 211**

13 4,941,576
70.6 4,941,577
186 4,941,578

**CLASS 215**

11.1 4,941,579
235 4,941,580
252 Re.33,265

**CLASS 219**

10.55 E 4,942,277
10.55 M 4,942,278
10.75 4,942,279
60.2 4,942,280
75 4,942,281
85.16 4,942,282
98 4,942,283
121.64 4,942,285
121.67 4,942,284
219 4,942,286
385 4,942,287
399 4,942,288
504 4,942,289

**CLASS 220**

1 T 4,941,653
1.5 4,941,581
2.1 R 4,941,582
5 A 4,941,583
5 R 4,941,584
23.2 4,941,585
83 4,941,586
85 VS 4,941,587
302 4,941,588
403 4,941,589
428 4,941,590

**CLASS 221**

100 4,941,591

**CLASS 222**

23 4,941,592
144.5 4,941,596
146.5 4,941,597
148 4,941,593
192 4,941,594
321 4,941,595
4,941,598
401 4,941,599
402.13 4,941,600

**CLASS 223**

24 4,941,601

**CLASS 224**

42.45 R 4,941,602
148 4,941,603
160 4,941,604

**CLASS 226**

97 4,941,605
118 4,941,606
189 4,941,607

**CLASS 227**

19 4,941,623

**CLASS 229**

117.13 4,941,624

**CLASS 235**

381 4,942,290

**CLASS 236**

12.12 4,941,608
78 D 4,941,609

**CLASS 238**

10 A 4,941,610
4,941,611

**CLASS 239**

88 4,941,612
124 4,941,613
294 4,941,614
309 4,941,615
310 4,941,616
400 4,941,617
432 4,941,618

**CLASS 241**

22 4,941,619

**CLASS 242**

67.1 R 4,941,620
118.1 4,941,621
129.7 4,941,622
131 4,941,625
231 4,941,626

**CLASS 244**

3.21 4,941,627
12.2 4,941,628

**CLASS 248**

62 4,941,629
71 4,941,630
178 4,941,631
221.2 4,941,632
228 4,941,633
229 4,941,634
346.1 4,941,635
430 4,941,636
4,941,637
481 4,941,638
549 4,941,639
562 4,941,640
588 4,941,641

**CLASS 249**

122 4,941,642
145 4,941,643

**CLASS 250**

203.3 4,942,291
203.4 4,942,292
213 VT 4,942,293
227.14 4,942,294
231.13 4,942,295
288 4,942,296
304 4,942,297
305 4,942,298
306 4,942,299
310 4,941,980
327.2 4,942,300
338.3 4,942,301
368 4,942,302
458.1 4,942,303
492.3 4,942,304
574 4,942,305
577 4,942,306

**CLASS 251**

360 4,941,644

**CLASS 252**

8.51 4,941,981
8.515 4,941,983
8.551 4,941,982
39 4,941,984
51.5 R 4,941,985
4,941,986
58 4,941,987
99 4,941,988
102 4,941,989
121 4,941,990
189 4,941,991
299.66 4,941,992
315.6 4,941,993
389.23 4,941,994
407 4,941,995
584 4,941,996
586 4,941,997
627 4,941,998

**CLASS 254**

324 4,941,645

**CLASS 261**

130 4,941,999

**CLASS 264**

22 4,942,000
4,942,001
27 4,942,002
29.2 4,942,011
40.4 4,942,003
40.5 4,942,004
45.3 4,942,005
50 4,942,006
122 4,942,007
150 4,942,008
317 4,942,009
328.12 4,942,010
510 4,942,012
511 4,942,013

**CLASS 266**

270 4,941,646
285 4,941,647

**CLASS 267**

131 4,941,648
140.1 4,941,649

**CLASS 270**

95 4,941,650

**CLASS 271**

209 4,941,654
242 4,941,655
278 4,941,656
293 4,941,657

**CLASS 272**

56.5 R 4,941,658
62 4,941,659
73 4,941,651
4,941,652
76 4,941,660

**CLASS 273**

15 R 4,941,661
25 4,941,662
29 A 4,941,663
35 B 4,941,664
142 H 4,941,665
169 4,941,666
185 C 4,941,667
248 4,941,668

**CLASS 277**

235 R 4,941,669

**CLASS 280**

87.021 4,941,670
91 4,941,671
4,941,672
112.2 4,941,673
281.1 4,941,674
615 4,941,675
685 4,941,676
690 4,941,677
732 4,941,678
775 4,941,679
793 4,941,680
804 4,941,681
4,941,682
807 4,941,683
851 B1 4,264,083

**CLASS 281**

42 4,941,684

**CLASS 282**

1 R 4,941,685

**CLASS 283**

72 4,941,688
87 4,941,686
91 4,941,687

**CLASS 285**

7 4,941,689
38 4,941,690
39 4,941,691
114 4,941,692
331 4,941,693

**CLASS 290**

38 R 4,942,307

**CLASS 292**

201 4,941,694
256.5 4,941,695
336.3 4,941,697
340 4,941,696

**CLASS 293**

155 4,941,701

**CLASS 294**

82.12 4,941,698
99.1 4,941,699
99.2 4,941,700

**CLASS 296**

37.6 4,941,702
4,941,703
97.11 4,941,704
100 4,941,705
213 4,941,706
216 4,941,707

**CLASS 297**

6 4,941,708
325 4,941,709
471 4,941,710

**CLASS 299**

79 4,941,711

**CLASS 303**

115 4,941,712
116 4,941,713

**CLASS 307**

202.1 4,942,308
270 4,942,309
271 4,942,310
272.3 4,942,311
296.8 4,942,312
326 4,942,313
352 4,942,314
358 4,942,315
455 4,942,316
465 4,942,317
4,942,318
4,942,319
546 4,942,320

**CLASS 310**

90.5 4,942,321
156 4,942,322
208 4,942,323
216 4,942,324
257 4,942,325
260 4,942,326
313 R 4,942,327

**CLASS 312**

31 4,941,714
184 4,941,715
205 4,941,716
265.3 4,941,717
306 4,942,328
312 4,941,718
341.1 4,942,329

**CLASS 313**

25 4,942,330
271 4,942,331
402 4,942,332
4,942,333
414 4,942,334
468 4,942,335

**CLASS 315**

3.5 4,942,336
39 4,942,337
111.71 4,942,338
111.81 4,942,339
241 P 4,942,340
403 4,942,341
410 4,942,342

**CLASS 318**

6 4,942,343
254 4,942,344
4,942,345
280 4,942,346
434 4,942,347
468 4,942,348
483 4,942,349
569 4,942,350
642 4,942,351

**CLASS 320**

2 4,942,352

**CLASS 323**

361 4,942,353

**CLASS 324**

71.2 4,942,354
156 4,942,356
158 R 4,942,357
4,942,358
309 4,942,359
329 4,942,360
360 4,942,361
402 4,942,362
631 4,942,363
696 4,942,364

**CLASS 328**

134 4,942,365

**CLASS 330**

4.3 4,942,366
9 4,942,367
282 4,942,368
296 4,942,369

**CLASS 331**

1 A 4,942,370
14 4,942,371
65 4,942,372

**CLASS 332**

124 4,942,374

**CLASS 333**

81 R 4,942,375
160 4,942,376
161 4,942,373
202 4,942,377

**CLASS 335**

216 4,942,378
301 4,942,379
4,942,380

**CLASS 337**

370 4,942,381
403 4,942,382

**CLASS 338**

42 4,942,383

**CLASS 340**

522 4,942,384
556 4,942,385
566 4,942,386
683 4,942,387
701 4,942,388
703 4,942,389
735 4,942,390
745 4,942,391
782 4,942,392
825.72 4,942,393
870.31 4,942,394
907 4,942,395

**CLASS 341**

101 4,942,396
118 4,942,397
4,942,398
143 4,942,399
155 4,942,400
157 4,942,401

**CLASS 342**

1 4,942,402
372 4,942,403
418 4,942,404

**CLASS 346**

107 R 4,942,405
108 4,942,406
4,942,407
140 R 4,942,408
4,942,409
160.1 4,942,410

**CLASS 350**

6.8 4,941,719
4,941,721
96.10 4,941,723
96.13 4,941,722
4,941,725
96.15 4,941,726
96.18 4,941,724
96.2 4,941,720
96.20 4,941,727
96.21 4,941,728
96.23 4,941,729
96.34 4,941,730
102 4,941,731
128 4,941,732
162.13 4,941,733
321 4,941,734
335 4,941,737
342 4,941,735
350 S 4,941,736
377 4,941,738
486 4,941,739
636 4,941,740

**CLASS 351**

221 4,941,741

**CLASS 353**

26 R 4,942,411

**CLASS 354**

125 4,942,412
173.11 4,942,413
195.12 4,942,414
234.1 4,942,415
299 4,942,416
400 4,942,417
408 4,942,418

**CLASS 355**

27 4,942,419
4,942,420
4,942,421
28 4,942,422
30 4,942,423
38 4,942,424
45 4,942,425
84 4,942,426
202 4,942,427
4,942,428
208 4,942,429
232 4,942,430
246 4,942,431
256 4,942,475
260 4,942,432
284 4,942,433
290 4,942,434
311 4,942,435

**CLASS 356**

38 4,941,742
311 4,941,743
346 4,941,747
358 4,941,744
401 4,941,745
444 4,941,746

**CLASS 357**

4 4,942,436
16 4,942,437
4,942,438
17 4,942,439
23.1 4,942,440
23.7 4,942,441
29 4,942,442
38 4,942,443
4,942,444
4,942,445
4,942,446
42 4,942,447
49 4,942,448
54 4,942,449
4,942,450
67 4,942,451
68 4,942,452
4,942,453
70 4,942,454
4,942,455
72 4,942,456

CLASS 358
12 4,942,457
29 4,942,458
41 4,942,459
75 4,942,460
4,942,461
76 4,942,462
96 4,942,463
108 4,942,464
133 4,942,465
4,942,466
135 4,942,467
138 4,942,468
153 4,942,469
160 4,942,470
165 4,942,471
188 4,942,472
213.11 4,942,474
213.26 4,942,473
335 4,942,476
401 4,942,477
409 4,942,478
448 4,942,479
455 4,942,480
471 4,942,481
474 4,942,482
484 4,942,483

CLASS 360
25 4,942,609
46 4,942,484
4,942,485
48 4,942,486
77.13 4,942,487
80 4,942,488
104 4,942,491
121 4,942,489
126 4,942,490
132 4,942,492

CLASS 361
23 4,942,493
49 4,942,612
93 4,942,494
220 4,942,495
309 4,942,610
321 4,942,496
385 4,942,497
388 4,942,498
428 4,942,499
516 4,942,500
523 4,942,501

CLASS 362
35 4,942,502
74 4,942,503
84 4,942,504
187 4,942,505
253 4,942,506
296 4,942,507

CLASS 363
19 4,942,508
89 4,942,509
127 4,942,510
136 4,942,511

CLASS 364
133 4,942,512
158 Re.33,267
184 4,942,513
190 4,942,514
200 4,942,515
4,942,516
4,942,517
4,942,518
4,942,519
4,942,520
4,942,521
4,942,522
4,942,523
4,942,524
4,942,525
401 4,942,527
419 4,942,526
422 4,942,528
424.01 4,942,529
424.05 4,942,532
424.1 4,942,530
424.2 4,942,531
449 4,942,533
468 4,942,534
474.06 4,942,611
478 4,942,535
490 4,942,536
512 4,942,537
513 4,942,538
4,942,539
514 4,942,540
519 4,942,541
523 4,942,542
550 4,942,543
557 4,942,613
569 4,942,544
571.01 4,942,545
4,942,614
574 4,942,546
578 4,942,615
748 4,942,547
784 4,942,548
786 4,942,549
900 4,942,550
4,942,551
4,942,552
4,942,553

CLASS 365
149 4,942,554
189.07 4,942,555
200 Re.33,266
4,942,556

CLASS 366
85 4,941,748
147 4,941,749
4,941,750
176 4,941,751
307 4,941,752

CLASS 367
15 4,942,557
91 4,942,558
137 4,942,560

CLASS 368
113 4,942,559
118 4,942,561

CLASS 369
44.11 4,942,562
4,942,563
58 4,942,564
59 4,942,565
113 4,942,566
124 4,942,567

CLASS 370
3 4,942,568
60 4,942,569
80 4,942,570
85.1 4,942,571
85.15 4,942,574
85.8 4,942,572
85.9 4,942,573

CLASS 371
10.1 4,942,575
21.2 4,942,576
22.3 4,942,577
36 4,942,578
51 4,942,579

CLASS 372
5 4,942,580
9 4,942,581
18 4,942,582
20 4,942,583
29 4,942,584
44 4,942,585
68 4,942,586
71 4,942,587
103 4,942,588

CLASS 374
120 4,941,753

CLASS 375
1 4,942,589
4,942,590
84 4,942,591
90 4,942,592
118 4,942,593

CLASS 376
261 4,942,014
4,942,015
310 4,942,594
418 4,942,016

CLASS 377
48 4,942,595

CLASS 378
109 4,942,596
197 4,942,597
207 B1 4,697,280

CLASS 379
57 4,942,598
93 4,942,599
100 4,942,600
209 4,942,601
212 4,942,602
398 4,942,603
412 4,942,604
424 4,942,605

CLASS 380
4 4,942,606

CLASS 381
31 4,942,607
43 4,942,608
51 4,942,616
182 4,942,617

CLASS 382
8 4,942,618
47 4,942,619
58 4,942,620
59 4,942,621

CLASS 383
3 4,941,754
119 4,941,755
127 4,941,756

CLASS 384
40 4,941,758
473 4,941,757
531 4,941,759
537 4,941,760

CLASS 400
124 4,941,761
636.1 4,941,762

CLASS 403
3 4,941,763
24 4,941,764
107 4,941,765
131 4,941,766
218 4,941,767
331 4,941,768
408.1 4,941,769

CLASS 404
72 4,941,770

CLASS 405
78 4,941,771
128 4,941,772
157 4,941,773
158 4,941,774
216 4,941,775
224 4,941,776

CLASS 406
13 4,941,777
28 4,941,778
138 4,941,779

CLASS 407
114 4,941,780

CLASS 408
72 B 4,941,781
147 4,941,782
204 4,941,783

CLASS 410
121 4,941,784

CLASS 411
82 4,941,785
136 4,941,787
178 4,941,788
369 4,941,789
432 4,941,790

CLASS 412
7 4,941,804
19 4,941,791

CLASS 414
208 4,941,792
225 4,941,793
341 4,941,794
403 4,941,795
409 4,941,796
462 4,941,797
619 4,941,798
678 4,941,799
695.7 4,941,786
752 4,941,800

CLASS 415
170.1 4,941,801

CLASS 416
164 4,941,802
204 R 4,941,805
242 4,941,803

CLASS 417
38 4,941,806
199.1 4,941,807
415 4,941,808
500 4,941,809

CLASS 418
15 4,941,810
195 4,941,811

CLASS 422
64 4,942,017
70 4,942,018
169 4,942,019
180 4,942,020
194 4,942,021
201 4,942,022

CLASS 423
22 4,942,023
65 4,942,024
282 4,942,025
326 4,942,026
328 4,942,027

CLASS 424
78 4,942,029
93 4,942,030
115 4,942,032
195.1 4,942,033
401 4,942,034
423 4,942,035
425 4,942,036
426 B1 4,767,628
448 4,942,037
450 4,942,038
466 4,942,039
486 4,942,040
520 4,942,031
613 4,942,041
683 4,942,042

CLASS 425
131.5 4,941,812
195 4,941,813
388 4,941,814
525 4,941,815
533 4,941,816

CLASS 426
2 4,942,043
4,942,044
11 4,942,045
233 4,942,046
271 4,942,048
302 4,942,047
329 4,942,049
394 4,942,050
489 4,942,051
512 4,942,052
524 4,942,053
611 4,942,054
633 4,942,055

CLASS 427
35 4,942,056
38 4,942,057
53.1 4,942,059
54.1 4,942,060
4,942,066
104 4,942,061
249 4,942,062
256 4,942,063
297 4,942,064
387 4,942,065
393 4,942,067
420 4,942,068
431 4,942,058

CLASS 428
36.9 4,942,070
40 4,942,071
48 4,942,072
64 4,942,073
95 4,942,074
109 4,942,075
137 4,942,076
152 4,942,077
192 4,942,078
209 4,942,079
212 4,942,080
218 4,942,081
224 4,942,082
252 4,942,083
284 4,942,084
288 4,942,085
290 4,942,086
332 4,942,087
336 4,942,088
364 4,942,089
367 4,942,090
389 4,942,069
398 4,942,091
401 4,942,092
423.3 4,942,093
447 4,942,094
461 4,942,095
476.1 4,942,096
552 4,942,097
555 4,942,098

CLASS 429
35 4,942,099
50 4,942,100
165 4,942,101

CLASS 430
1 4,942,102
7 4,942,103
56 4,942,104
59 4,942,105
72 4,942,106
138 4,942,107
169 4,942,108
175 4,942,109
198 4,942,110
273 4,942,111
282 4,942,112
326 4,942,113
434 4,942,114
523 4,942,115
555 4,942,116
558 4,942,117
4,942,118
564 4,942,119
567 4,942,120
583 4,942,121

CLASS 431
263 4,941,817
268 4,941,818

CLASS 432
8 4,941,819
58 4,941,820
106 4,941,821
112 4,941,822
152 4,941,823
233 4,941,824

CLASS 433
14 4,941,825
51 4,941,826
74 4,941,827
114 4,941,828

CLASS 434
118 4,941,829

CLASS 435
5 4,942,122
6 4,942,123
4,942,124
7 4,942,125
4,942,126
11 4,942,127
101 4,942,128
182 4,942,129
194 4,942,130
240.27 4,942,131

CLASS 436
66 4,942,132
125 4,942,133
161 4,942,134
178 4,942,135
512 4,942,136

CLASS 437
63 4,942,137
182 4,942,138
209 4,942,139
211 4,942,140

CLASS 439
59 4,941,830
63 4,941,831
70 Re.33,268
71 4,941,832
92 4,941,833
4,941,834
152 4,941,835
247 4,941,836
341 4,941,837
350 4,941,838
352 4,941,839
376 4,941,840
377 4,941,841
399 4,941,842
425 4,941,843
4,941,844
505 4,941,845
578 4,941,846
595 4,941,847
607 4,941,848
610 4,941,849
4,941,850
621 4,941,851
733 4,941,852
848 4,941,853

CLASS 440
1 4,941,854
104 4,941,855

CLASS 446
220 4,941,856
353 4,941,857
397 4,941,858
476 4,941,859

CLASS 455
278 4,942,622
612 4,942,623

CLASS 464
68 4,941,860
102 4,941,861
141 4,941,862

CLASS 474
33 4,941,863
133 4,941,864

CLASS 475
128 4,941,370

CLASS 493
22 4,941,865

CLASS 494
14 4,941,866
16 4,941,867
37 4,941,868

CLASS 501
40 4,942,144
90 4,942,145
134 4,942,146

CLASS 502
113 4,942,147
115 4,942,148
401 4,942,149

CLASS 503
213 4,942,150
227 4,942,141

CLASS 505
1 4,942,142
4,942,151
4,942,152

CLASS 514
2 4,942,153
26 4,942,154
34 4,942,155
56 4,942,156
108 4,942,157
170 4,942,158
202 4,942,159
216 4,942,160
222.8 4,942,143
226.5 4,942,167
231.2 4,942,161
252 4,942,162
254 4,942,163
261 4,942,165
282 4,942,166
313 4,942,168
318 4,942,169
326 4,942,170
376 4,942,183
399 4,942,171
441 4,942,172
449 4,942,184
452 4,942,173
532 4,942,174
535 4,942,175
539 4,942,176
560 4,942,177
617 4,942,178
659 4,942,179
691 4,942,180
730 4,942,181
812 4,942,182

CLASS 521
54 4,942,185

CLASS 523
131 4,942,186
200 4,942,187
212 4,942,188
339 4,942,189
400 4,942,190

CLASS 524
17 4,942,191
44 4,942,192
276 4,942,193
281 4,942,194
294 4,942,195
327 4,942,196
496 4,942,197
510 4,942,198
724 4,942,199

CLASS 525
66 4,942,200
71 4,942,201
104 4,942,202
185 4,942,203
293 4,942,204
326.2 4,942,205
333.8 Re.33,269
397 4,942,206
414 4,942,208
476 4,942,207

CLASS 526
173 4,942,209
348.7 4,942,210

CLASS 528
14 4,942,211
28 4,942,212
4,942,213
59 4,942,214
70 4,942,164

| | |
|---|---|
| 114 | 4,942,215 |
| 125 | 4,942,216 |
| 129 | 4,942,217 |
| 272 | 4,942,219 |
| 336 | 4,942,220 |
| 381 | 4,942,218 |
| 493 | 4,942,222 |
| 501 | 4,942,223 |
| **CLASS 530** | |
| 387 | 4,942,224 |
| **CLASS 534** | |
| 560 | 4,942,225 |
| **CLASS 536** | |
| 23 | 4,942,226 |
| 27 | 4,942,227 |
| 119 | 4,942,228 |
| **CLASS 540** | |
| 310 | 4,942,229 |
| 456 | 4,942,230 |
| 586 | 4,942,231 |
| **CLASS 544** | |
| 76 | 4,942,232 |
| 212 | 4,942,233 |
| 332 | 4,942,234 |
| **CLASS 546** | |
| 18 | 4,942,235 |
| 64 | 4,942,237 |
| 242 | 4,942,238 |
| 290 | 4,942,239 |
| 298 | 4,942,240 |
| 334 | 4,942,236 |
| **CLASS 548** | |
| 131 | 4,942,241 |
| 192 | 4,942,242 |
| 193 | 4,942,243 |
| 268.2 | 4,942,244 |
| 329 | 4,942,245 |
| 367 | 4,942,246 |
| 505 | 4,942,247 |
| 533 | 4,942,248 |
| **CLASS 549** | |
| 407 | 4,942,249 |
| **CLASS 552** | |
| 234 | 4,942,251 |
| **CLASS 556** | |
| 70 | 4,942,252 |
| **CLASS 558** | |
| 6 | 4,942,253 |
| 250 | 4,942,254 |
| 408 | 4,942,221 |
| 411 | 4,942,250 |
| **CLASS 560** | |
| 41 | 4,942,255 |
| 121 | 4,942,256 |
| **CLASS 562** | |
| 481 | 4,942,257 |
| 599 | 4,942,258 |
| **CLASS 564** | |
| 187 | 4,942,259 |
| 298 | 4,942,260 |
| 480 | 4,942,261 |
| **CLASS 568** | |
| 32 | 4,942,262 |
| 476 | 4,942,263 |
| 635 | 4,942,264 |
| 724 | 4,942,265 |
| 864 | 4,942,266 |
| **CLASS 570** | |
| 109 | 4,942,267 |
| 206 | 4,942,268 |
| **CLASS 585** | |
| 240 | 4,942,269 |
| **CLASS 600** | |
| 28 | 4,941,453 |
| 32 | 4,941,869 |
| 36 | 4,941,870 |
| | 4,941,871 |
| **CLASS 604** | |
| 27 | 4,941,872 |
| 54 | 4,941,873 |
| 60 | 4,941,874 |
| 81 | 4,941,875 |
| 89 | 4,941,876 |
| 96 | 4,941,877 |
| 105 | 4,941,878 |
| 110 | 4,941,879 |
| 143 | 4,941,880 |
| 162 | 4,941,881 |
| 180 | 4,941,882 |
| 186 | 4,941,883 |
| **CLASS 606** | |
| 59 | 4,941,481 |
| 80 | 4,941,466 |

## CLASSIFICATION OF DESIGNS

| | | |
|---|---|---|
| D1— | 128 | 309,210 |
| D2— | 318 | 309,211 |
| | 602 | 309,212 |
| D3— | 35 | 309,213 |
| | 40 | 309,214 |
| | 76 | 309,215 |
| D4— | 114 | 309,216 |
| | 116 | 309,217 |
| | 135 | 309,218 |
| D6— | 316 | 309,219 |
| | 317 | 309,220 |
| | 328 | 309,221 |
| | 366 | 309,222 |
| | 373 | 309,223 |
| | 408 | 309,224 |
| | 525 | 309,225 |
| | 552 | 309,226 |
| | 601 | 309,227 |
| | 604 | 309,228 |
| | 610 | 309,229 |
| D7— | 313 | 309,231 |
| | 398 | 309,232 |
| | 407 | 309,233 |
| | 409 | 309,234 |
| | | 309,235 |
| | 605 | 309,237 |
| | | 309,238 |
| | | 309,239 |
| | 647 | 309,236 |
| | 673 | 309,230 |
| | 679 | 309,240 |
| | 700 | 309,241 |
| D8— | 6 | 309,242 |
| | 10 | 309,243 |
| | 14 | 309,244 |
| | 41 | 309,245 |
| | 82 | 309,246 |
| | 323 | 309,247 |
| | 338 | 309,248 |
| | 354 | 309,249 |
| | 356 | 309,250 |
| | 367 | 309,251 |
| | 373 | 309,252 |
| | | 309,253 |
| | 375 | 309,254 |
| | 395 | 309,255 |
| D9— | 300 | 309,256 |
| | 305 | 309,257 |
| | 341 | 309,258 |
| | 376 | 309,259 |
| | 378 | 309,260 |
| | 398 | 309,261 |
| | 418 | 309,262 |
| | 432 | 309,263 |
| | 438 | 309,264 |
| | 452 | 309,265 |
| D10— | 6 | 309,266 |
| | 39 | 309,267 |
| | 50 | 309,268 |
| | 57 | 309,269 |
| | | 309,270 |
| | | 309,271 |
| | 96 | 309,272 |
| | 113 | 309,273 |
| | 119 | 309,274 |
| D11— | 11 | 309,275 |
| | 26 | 309,276 |
| | 27 | 309,277 |
| | 35 | 309,278 |
| | 164 | 309,279 |
| | 215 | 309,280 |
| D12— | 99 | 309,281 |
| | 146 | 309,282 |
| | 148 | 309,283 |
| | 149 | 309,284 |
| | | 309,286 |
| | 181 | 309,285 |
| | 196 | 309,287 |
| D13— | 114 | 309,288 |
| | 147 | 309,289 |
| | 161 | 309,291 |
| | 169 | 309,290 |
| | 184 | 309,292 |
| D14— | 100 | 309,293 |
| | | 309,294 |
| | | 309,295 |
| | 105 | 309,296 |
| | | 309,297 |
| | 107 | 309,298 |
| | 109 | 309,299 |
| | 114 | 309,300 |
| | 138 | 309,301 |
| | | 309,302 |
| | 144 | 309,303 |
| | | 309,304 |
| | 225 | 309,305 |
| | 249 | 309,306 |
| | 251 | 309,307 |
| D15— | 7 | 309,308 |
| | 13 | 309,309 |
| | 14 | 309,310 |
| | 17 | 309,311 |
| | | 309,312 |
| | 25 | 309,313 |
| | 28 | 309,314 |
| | 78 | 309,315 |
| | 134 | 309,316 |
| | 139 | 309,317 |
| D16— | 112 | 309,318 |
| D17— | 22 | 309,319 |
| D18— | 1 | 309,320 |
| | 13 | 309,321 |
| | 40 | 309,322 |
| | | 309,323 |
| D19— | 26 | 309,324 |
| | 62 | 309,325 |
| D20— | 43 | 309,326 |
| D21— | 2 | 309,327 |
| | 12 | 309,328 |
| | | 309,329 |
| | | 309,330 |
| | 13 | 309,331 |
| | 108 | 309,332 |
| | 166 | 309,333 |
| | 178 | 309,334 |
| | 194 | 309,335 |
| | | 309,336 |
| | | 309,337 |
| | 217 | 309,338 |
| D22— | 116 | 309,339 |
| | 141 | 309,340 |
| D23— | 200 | 309,341 |
| | 239 | 309,342 |
| | 269 | 309,343 |
| | 323 | 309,344 |
| | 325 | 309,345 |
| | | 309,346 |
| | 386 | 309,347 |
| | 387 | 309,348 |
| D24— | 17 | 309,349 |
| | 26 | 309,350 |
| D25— | 119 | 309,351 |
| D27— | 135 | 309,352 |
| D28— | 26 | 309,353 |
| | 35 | 309,354 |
| | 48 | 309,355 |
| | 56 | 309,356 |
| | 77 | 309,357 |
| | 78 | 309,358 |
| D29— | 11 | 309,359 |
| | 22 | 309,360 |
| D32— | 62 | 309,361 |
| | 70 | 309,362 |
| D34— | 24 | 309,363 |
| | 39 | 309,364 |

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| | | |
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| P.— | 68 | 7,270 |
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27 : 309,218

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36 : 309,263
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39 : 309,261
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48 : 309,219
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53 : 7,272

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